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With the issuance of the present volume, publication of The Mailing List has been suspended for the duration of the war. The paper shortage, the large amount of official literature on current military developments, and the increasing proportion of otherwise suitable material which cannot be printed in an unclassified publication are responsible for this decision. It is the hope of the Commandant that at a suitable time in the future publication will be recommenced and that The Mailing List will resume the useful role it has filled since 1930.

PREFACE

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CHAPTER 1

Report From Italy

The observations in this chapter concern the 36th Infantry Division. The chapter was prepared by the general officer who commanded the division during the operations in question.

The division landed at Salerno, Italy, on 9 September 1943 and continued in the Italian campaign, including the operations at the Anzio beachhead, until 25 June 1944, when it was relieved after having reached a point approximately 20 miles south of Livorno. In this period, it participated in one landing operation, in more than two months of mountain warfare, in numerous attacks on fortified towns, in one river crossing, and in a pursuit of nearly 250 miles over varied terrain. During all of these operations, the division was reinforced by a battalion of medium tanks, a battalion of tank destroyers, a battalion of antiaircraft artillery, and a battalion (or less) of chemical troops.

The deportment of the soldiers during the campaign—their adaptability, cheerfulness, acceptance of hardship, and evolution into mature veterans—was a source of pride to all who observed them. Most of the time during the operations in the mountains, the weather was bad. Rain was almost constant; there was seldom any shelter; the men were wet to the skin night and day; the mud was deep; the nights were cold. The German artillery and mortar fire was nerve-racking. There were no adequate troop trails in the mountains. Supply of food, water, and ammunition was extremely difficult. In some instances, an entire infantry battalion had to be detailed to carry supplies for another

battalion. It was impossible to furnish hot food, and the men existed for weeks at a time on C and K rations. Later, during dry periods, their supply of water was limited to one canteen per day. Evacuation of the wounded and sick was so difficult that as many as eight hours sometimes were required to carry a man on a litter down the precipitous slopes to an ambulance.

These conditions caused the troops hardships as severe as any ever undergone by soldiers of the United States anywhere. Yet, in spite of them, they retained a cheerfulness, a confidence, and, in most cases, a fighting ability far superior to that of the enemy. In the opinion of their commanding general, they are capable of being made into the best soldiers in the world.

PERSONNEL

The enlisted infantry replacements furnished the division were, on the whole, satisfactory. However, their inactivity at ports of embarkation and aboard transports had given them an opportunity to forget much that they had previously learned. Before going into combat, they needed refresher training in the techniques and skills that are essential in battle. A course in such training was developed by the division for all enlisted infantry replacements. It included small-unit problems, marksmanship, battle drill, patrolling, and other subjects, and was conducted by the officers and noncommissioned officers of the companies to which the replacements were assigned. This developed confidence on the part of the replacements in the men who were to lead them in battle.

A proper refresher course can be given in three weeks. Such a course, in addition to its instructional value, has usefulness in giving replacements a sense of teamwork and confidence. These things are especially important during the first days of battle, because they help dispel the fear of the unknown that grips all new men.

Officer replacements of company grade, for nearly all types of units in the division, were not entirely satisfactory. Many of them lacked personal initiative and imagination, were not aggressive, and failed to look ahead and prepare for likely eventualities.

Infantry officer replacements of field grade were sometimes unsatisfactory for the same reasons. More frequently, they did not have the tactical knowledge to command a unit in combat. This deficiency was remedied by withholding them from command for three to five weeks, during which period they acted as observers while acquiring the necessary "know how." Officers without battle experience who are to be sent to a theater of operations for duty as infantry battalion commanders would be benefited by a course in battle methods prior to their departure.

Higher commanders and staff officers sometimes failed to appreciate the time required by combat units to assemble troops and supplies, make necessary reconnaissances, and prepare and issue orders all down the line. As a result, it was not always possible for combat units to perform their missions exactly as ordered.

On the other hand, commanders of smaller units too often were unprepared to take prompt action on missions assigned them. Their commands would not be in hand; personnel not assembled; vehicles not properly serviced; communications faulty; supplies not issued. Inexperienced commanders, understandably, like to be warned of impending operations, but this is not always possible. Good commanders keep their units ready for action on short notice. There were occasions when the division was unable to take advantage of opportunities to cut off or isolate German troops because commanders needed for the missions were unprepared to act promptly.

Many of the division's officers and men too often waited to be told what to do next. An infantry battalion (or any other combat unit) is not properly trained until every individual in the battalion can do his job over a

considerable period of time without orders. Commanders in battle cannot be everywhere; sometimes they become casualties. Although a commander should be where he can best control his unit, control during battle is usually exercised more as a result of prior training and force of habit than by direct orders. Just as the members of a football team act on their own initiative, but according to a prearranged plan, as soon as the ball is passed, so all the members of a combat unit must act together as a team, on their own initiative, and without orders, after an attack has begun. Yet they must always act in conformity with the commander's plans. This is not difficult, but it demands thorough training. It should be a primary training objective of all unit commanders.

ARTILLERY AND AIR BOMBARDMENT

When the division under discussion first came into contact with the enemy, it felt that artillery fire could destroy or neutralize a defensive position. It believed that artillery concentrations, even on determined troops well dug in, could demoralize the defenders and permit the attacking infantry, following the artillery concentrations closely, to capture the position. This is all right in theory, but works only occasionally in practice. Of course, when artillery can be directed against personnel above ground or poorly dug in, the destructive effect of the fire is great.

In the Italian campaign, special efforts were made to provide close air support for the infantry. On a number of occasions, however, our own troops were bombed, with demoralizing effects, as a result of mistaken identification by our pilots. (At Cassino, some of our troops were bombed and fired on by their own air and artillery because certain ground commanders were unable to orient themselves and reported the locations of their units inaccurately.) This leads to the conclusion that close air support should be restricted to areas beyond range of the medium artillery. At shorter ranges, the artillery forward observers and air observers discover targets and bring artillery fire on them with speed and good effect.

Many Italian villages were destroyed by artillery in an effort to dislodge Germans known to be in the area. Civilians in these villages were killed, while the fire frequently proved ineffective because the rubble was almost as good cover as the buildings had been. In general, the same was true of aerial bombardment of similar positions.

We made too many frontal attacks on villages, and suffered unnecessary losses as a result. The proper way to take a town or other organized locality is to by-pass it and envelop it from the rear whenever this is possible. One of the best methods of attacking a defensive position which cannot be neutralized by artillery fire is by night infiltration. An excellent example of successful combining of these two methods—infiltration and envelopment—was the division's capture of Velletri.

THE CAPTURE OF VELLETRI

In May, the division was transferred to the Anzio beachhead, where it was placed in reserve. After the first few days of the offensive launched by the beachhead forces, the division was assigned the mission of capturing Velletri, a strongly organized locality on the German defensive position. Intelligence reports indicated that the Germans were not holding in strength the wooded hills north of the town. It was decided to break through on that front, occupy a hill mass which lay beyond, and capture Velletri from the flank and rear.

Under cover of darkness, the entire division sector was taken over by another unit, and the division quickly transferred to the right. All three infantry regiments, all the division artillery, and two companies of medium tanks moved through a gap 1,000 yards wide, which had been made in the German line, to a position in rear of the German defenses. The Germans were aware of the movement, but they thought it was being made by not more than a battalion.

The hill mass was covered with brush and vineyards; there were no roads on it. The vegetation was so thick that the limit of visibility was only about 30 yards. A passage

for the tanks was made by several bulldozers moving in column, each adding a foot or more to the width of the track. The tanks followed the rear bulldozer. The artillery followed the tanks. A part of an infantry battalion protected the column. As a result of building this tank trail, when the leading infantry troops emerged on the far side of the hill mass, tanks were ready to support them.

After the infiltration had been accomplished, the German defenses around Velletri were struck from the rear. The encircling movement was made through brush by infantrymen who were opposed by a German reinforced parachute regiment. The Germans fought desperately. They wore camouflaged clothing, wrapped branches and grapevines around themselves, lay down in the brush, and waited for the attackers to come into view. They would then fire, run back 50 or 60 yards, and lie down again to repeat the same procedure. The Americans therefore fired into every clump of brush that could possibly conceal a German. This method used up much small-arms ammunition, but it saved a lot of American lives and killed many Germans.

The German paratroopers in this sector were young men who were well led. But, after a day or two, groups of them became isolated and lost, and were surrounded. Many surrendered. The parachute troops were reinforced by improvised units hastily assembled from replacement centers, hospitals, and schools, and by clerical personnel and stragglers. But Velletri was captured. Its fall broke the German defenses east of Rome and prepared the way for the German retreat. From there the division pursued the disorganized German forces to Rome and beyond.

GUERRILLAS AND PATROLS

North of Rome, bands of Italian guerrillas became more and more active. They operated in the hills, killing or capturing small groups of Germans. They also protected and assisted escaped Allied prisoners of war.

The guerrillas were of material assistance to American units in furnishing information on the strength, equipment,

and movements of retreating German units. This information supplemented that from the usual sources—prisoners, aerial photographs and reconnaissance, friendly civilians, artillery observation posts, and infantry patrols. Skilled interrogators to question civilians and prisoners were a necessity.

On the subject of patrolling, it is impossible to lay down many specific rules. Too much depends on varying circumstances—the nature of the mission, experience of the members of the patrol, equipment available, length of time the patrol is to operate, and the terrain to be patrolled. It is very important, however, that directives by regiment or higher authority for night patrols be in possession of battalion commanders at least two hours before darkness, in order that warning orders may be issued and reconnaissances made by daylight. Attempts to organize successful patrols after dark nearly always failed. Without having had an opportunity to check key terrain features and routes during daylight, it is too difficult for a night patrol to keep oriented. The best weapon for night patrolling is the submachine gun.

DIVISION ARTILLERY

Artillery liaison within the division was organized as follows: With each infantry battalion were two forward-observer groups and one liaison group. These groups were furnished by the artillery battalion which habitually worked with the infantry regiment in question. The forward observers operated directly under the artillery liaison officer, and were always up where they could see the location of friendly, as well as enemy, troops. The observers were alert for targets 24 hours a day, and were accustomed to bringing down concentrations on their own initiative, although of course they worked closely with the commanders of the supported units.

In addition, it was the practice to keep two observation planes in the air at all times during daylight to pick up targets which might not be visible to the forward observers.

These air observers also ordered concentrations on targets which they discovered.

By these methods, suitable artillery targets were quickly disposed of. During the entire campaign, there was not one German counterattack in the division's sector which was not blasted by artillery fire. The infantry of the division was very proud of its artillery support and always spoke of it enthusiastically.

TACTICS OF SUPPORTING ARMS

Too many combat unit commanders expect to fight battles under ideal conditions. When they find that conditions are otherwise, they tend to feel that their units are helpless. Commanders of tank, antitank, chemical, air, engineer, and other units often complain that they are unable to employ their units according to the best tactical principles. This may be quite true, but the commanders should understand that ideal tactical conditions are seldom realized in battle. They must learn to regard certain handicaps as entirely normal.

For example, in southern Italy, the front was so wide that it could not always be covered by infantry alone. It was necessary at times to assign armored and reconnaissance units to cover intervals between infantry defense areas. This was far from an ideal employment of these units, especially at night, but they were the only troops available for the purpose.

Again, most officers in armored units contemplate their use under conditions of a break-through. This, of course, is the ideal; however, the Germans are clever in maintaining a continuous front and take special precautions to defend areas suitable for tanks. Therefore, the conception that tanks are to be used only for a break-through does not fit in with the conditions as they exist. Armor must work with infantry as a team, whether or not a break-through is possible.

Under the conditions obtaining in Italy, five tanks and five tank destroyers were all that were necessary to work with an infantry battalion. It was dangerous to line up long

columns of armor on a road when only a few of the leading vehicles could be profitably employed.

To use tanks in the open to attack a prepared defensive position is costly also. Eleven tanks were burned up within a small area near Cisterna during such an attack. They were all knocked out by two well-concealed German antitank guns. Our tanks were moving forward in an open field, and the German gunners had a picnic, taking them one by one.

At Salerno, where streams, ditches, fences, and embankments limited tank action to small areas, the Germans used tanks offensively in groups of from 5 to 10. The division's antitank gunners kept their weapons concealed, and waited for the German tanks to move out in an attack. The division's tanks and tank destroyers were held to the rear of selected firing positions and moved up only for short periods when suitable targets were observed. The division knocked out 60 enemy tanks in this manner and lost only 7 of its own. Artillery fire was also used to drive enemy tanks from concealed positions out into the open where antitank guns could get at them. But artillery observers can mistake friendly tanks for enemy, in spite of identifying markings.

In the mountains, tanks and other armored vehicles were limited to certain evident corridors which were relatively easy to defend.

In any attack—landing, river crossing, or other type—which involves armored opposition, antitank weapons in the form of tanks, tank destroyers, or artillery must give close support to the leading infantry companies. The antitank weapons of the infantry units are not sufficient, particularly in an offensive operation. They are too slow, too vulnerable, and too dependent on roads. The best weapon for taking the enemy's armored counterattacks under fire before they can reach the attacking infantry is the M10 tank destroyer.

Because it was unable to apply this principle, the division suffered a very costly defeat in an attempted river crossing at night. Armor was needed on the other side of the river

by daylight if the infantry was to be able to hold the bridgehead. But bridges to get the armor across could not be built because the approaches to the designated bridge sites were too exposed. Neither trucks nor tanks could operate near them in the face of the enemy fire. The bridgehead was not held.

TRANSPORT AND SUPPLY

In the mountains, supplies were loaded on mule-pack trains at the point of farthest advance of vehicles. When the mules could advance no farther, men back-packed the loads the rest of the way. There never were enough mules; as a result, some back-packing was always necessary all the way from the end of vehicle transport to the mountaintops. In addition to the personnel required to carry supplies, extra litter bearers, extra military police, and extra signal-communication personnel to lay wire were frequently required. All these men were taken from the infantry combat units. This was not a satisfactory solution, but was the only one possible.

The motor transportation authorized for the division was adequate so long as corps and army were able to furnish additional trucks whenever the division was ordered to move. Otherwise, its mobility was reduced.

The division went through Rome beginning at 0200 on 5 June. Infantrymen rode on top of loaded trucks, on gun tubes, on truck radiators, on tanks, on anything that would support them. As many as 17 were counted riding on a single jeep with trailer; as many as 6 on a 105-mm howitzer. This was certainly overloading, but it helped to get the entire division west of Rome by 1200 the same day.

As the advance continued north of Rome, supply difficulties increased. Higher echelons were no longer able to supplement the division's organic transport, and extreme measures were resorted to in order to keep the division going. At one time it was necessary to take away all the transportation of two field-artillery battalions, leaving them only

a few radio vehicles. In order to displace the artillery forward, the vehicles of one battalion would move that battalion forward, then return and bring up another battalion. While such procedure would ordinarily be avoided, it was the only way in which the necessary transportation could at this time be secured to supply the division over the long distance the trucks were required to go.

MISCELLANEOUS

Throughout all operations, an effort was made to hold out, in reserve, portions of all units, so that they could obtain some rest. In the case of infantry regiments, this was done by rotating the battalions in reserve. In the case of tank and tank-destroyer units, it was done by rotating the platoons on front-line duty. During the rapid advance north of Rome, it was the practice to permit infantry battalions to remain in reserve for 24 to 36 hours. They were then transported by truck to the front line to pass through other battalions and take over the advance. Men who became exhausted in battle were sent to the service-train bivouacs of their units, where they were allowed to rest several days before being sent back into the line.

All personnel in Italy had to be constantly alert to detect German mines. The Germans used a variety of them; about 5 percent were of plastic or wood. They were laid according to a pattern, so that, after one or two were located, the detection of the others was relatively easy. The Germans habitually placed antipersonnel mines in areas where our troops could be expected to bivouac, and many men had their feet blown off. Since vehicles would occasionally run into mines in entirely unexpected places, most of them were provided with sandbags or steel plates, which helped reduce casualties. Every soldier should know how to search for and remove mines of all types.

The collection and burial of the dead was handled by the individual units. In each regiment, an officer, two noncommissioned officers, 10 enlisted men, and two trucks were detailed to collect and transport the dead to the cemetery. Every effort was made to avoid temporary burials. Special

pains were taken to insure that no man was ever reported as killed in action unless it was known definitely that he had been killed. In case of doubt, he was reported missing in action until further investigation could be made.

While the requirement that all individuals should wear identification tags was strictly enforced, it was also found very desirable to mark items of clothing. After this practice was inaugurated, the division buried very few unknown dead.

CHAPTER 2

Combat Notes

This chapter was written by a general officer who has commanded American troops in action in the present war against both the Germans and the Japanese. His most recent command in a theater of operations was an infantry division which was in continuous contact with the enemy for the 45 days immediately following the Allied landings in northern France.

Many splendid instances could be cited to show that where leaders and troops apply sound methods in battle, success follows. Deficiencies will be cited freely here, because they have been common to many units, and one must attempt to profit by a consideration of faults as well as virtues.

DISCIPLINE

Many soldiers act as though all rules are suspended when they enter a combat zone. Individual sanitation is neglected unless the leaders are alert. Small articles of equipment are abandoned. Water discipline is forgotten. Men expose themselves to observation until they learn better by harsh experience. They neglect their weapons. To prevent this slackness, troops must be so controlled and spruced up during training that they become proud of their disciplined qualities.

Bivouac discipline of green troops is often especially bad. An example was furnished by one unit on its first night in Normandy, where German reconnaissance planes often made sorties at night over the Allied positions. When the first enemy airplane was heard over this outfit's bivouac, every man who could lay his hands on a weapon opened fire. The enemy could not have asked for better information than that provided by this futile fire.

BUNCHING

The oldest complaint about our troops in battle is that they do not disperse sufficiently. Unfortunately, it is still true. Comparatively few casualties are caused by gunfire. The great majority of them are the result of mortar fire, which our enemies lay down with speed and accuracy. Instances in which a single mortar shell has caused a dozen casualties, including both officers and men, are not rare. It is evident that our training must not only continue to emphasize the need for dispersion, but must increase the emphasis.

TANKS

The invulnerability of tanks is largely a myth. This should be emphasized in training. When attacked by tanks, infantrymen must remain in place and kill the accompanying hostile infantry. In every observed instance on which these notes are based, German accompanying tanks did not continue the attack after their accompanying infantry had been killed or stopped by fire.

A feeling of great helplessness suffuses the individual infantryman when attacked by tanks. Often the terrain makes it impossible for organic antitank weapons to keep up with the foot troops. Therefore the infantryman must be shown that the antitank rocket really is effective against tanks; that, while riflemen are destroying the accompanying hostile infantry, rocket teams can stalk the tanks and destroy them. Realization of the effectiveness of this combination does much to eliminate fear of tanks.

Many of our troops fail to realize that friendly tanks operating with them must be covered by actually delivering small-arms fire all around them. They seem to fear that this fire may damage the tanks. But, unless friendly riflemen place a protective screen of small-arms fire around a tank, it can be knocked out by enemy with rocket launchers, sticky grenades, mine strings, or other light weapons. Our training should include exercises, in which ball ammunition is fired, for small infantry units working with small groups of tanks.

SMALL-UNIT TACTICS

Simple fire-and-movement tactics win the fight. This principle cannot be stressed too much. It is the one thing that will break a stalemate in battle. Whenever a unit is stopped by fire, some part of it must promptly return the fire, while some part initiates movement. There have been occasions when one or two men crawling toward the enemy or toward his flank have actually caused him to break.

New troops can be led forward if they are required to fire liberally. The individual should be taught that, in many combat situations, no hostile targets are visible. Even so, he must fire at those points from which he thinks the enemy fire is coming. By this means, although the enemy may not be shot out, he will probably be neutralized; in any case, the effectiveness of his fire will be reduced.

The more vigorous the base of fire is, the greater the mobility of the maneuvering element. If all its rifle squads are thoroughly indoctrinated with this principle, a company or a battalion will seldom be "pinned to the ground."

Being "pinned to the ground" by the Germans for any length of time is certain to result in casualties. When the Germans stop an infantry unit for more than 10 or 15 minutes, they invariably punish it severely with mortar fire.

In training, complicated squad or platoon problems must be avoided. They are not worth the time they require to run. Simple, direct fire-and-movement problems, designed so that the leaders must act quickly and maintain control of their units, must be practiced again and again. Plenty of time should be given to this subject, even at the expense of curtailing more advanced training. The unit that knows how to fire and how to move under fire is a winning unit.

PATROLLING

Patrolling is weak in our units until the personnel has gained combat experience. The subject is of high importance, and not enough time has been devoted to it.

One phase which must be covered in training is that of organizing and planning patrolling along a battalion or regimental front. To tell a unit to "maintain contact with the enemy by vigorous patrolling" is inadequate and often dangerous. At best, it will produce little of value. Objectives must be defined, missions assigned, routes and alternate routes in both directions planned. Recognition must be assured. The entire plan must be designed to secure a chain of positive or negative information that will produce the desired intelligence.

A new unit must be carefully "broken in" to patrolling. Simple, easy missions should be assigned initially. But missions *must* be accomplished. If necessary, a patrol that fails should be sent out again. As the personnel acquire skill and confidence, the difficulty of the missions can be increased. But it is hard to get good patrolling from a unit whose first patrols are badly shot up.

COMMUNICATION

Forward units often grow careless about radio security. Late one afternoon in France, a certain battalion radioed in the clear: "What is the effective strength of George Company?" Answer: "Approximately 80 men." Battalion: "The old man does not wish you to advance beyond the church about 400 yards to your front." It is hardly necessary to point out the danger involved in such lack of radio discipline and the need for simple abbreviated codes for transmitting such messages.

JUNIOR LEADERS

The training and development of lieutenants and noncommissioned officers must be continuous. Casualties among them are high; therefore, understudies must be trained. Commanders sometimes complain that their basic privates are not of noncommissioned caliber. Even if this is true, if it is the only material available it must be trained. Three men should be trained for every noncommissioned officer position.

During training, noncommissioned officers should be given every possible opportunity to exercise authority—on the drill field, in bivouac, in barracks, on work details. They should be "bosses" in fact as well as theory. Information and instruction should be given through them, so that their men become accustomed to looking to them for guidance at all times. The squad leader, for example, should be the private's leader, teacher, and adviser in everything affecting his military existence. If a private needs an oil-and-thong case, he should go to his squad leader rather than to the supply sergeant.

Small units should go on independent training missions under their own leaders. The missions should be of such difficulty that they cannot be accomplished unless the leaders have real control of their units. In firing problems and other field exercises, control should remain with the junior leaders, and must not be usurped by safety officers or umpires.

COMPANIES

The biggest problem of the company commander in battle is to maintain control and direction. Training exercises to develop this technique must be practiced endlessly. The company must be able to advance, close, and change direction over all types of terrain, by daylight or in darkness. Each company commander must devise his own system of control to meet the conditions of the moment.

Technique of control must embrace the ability to organnize for an attack from a night security position. This is not easy. Many companies have great difficulty in getting off on time, in proper formation, and in the right direction for a dawn attack from a position in which immediate contact with the enemy has existed throughout the night. Even the problems of feeding and watering and resupplying ammunition under such conditions will be solved only when the company commander has effective and positive control.

Too much dependence on radio must be avoided. Extra company runners must be trained and used freely.

BATTALIONS

Everything noted above in regard to control of the company is applicable also to the battalion. Battalion commanders must be required to develop a positive control technique. They must be able to move their battalions in various combat formations to the front, to the oblique, or to the flank. They must be able to maintain direction through some system of effective but simple checks. These things must be done under all conditions of terrain and visibility. They are often neglected in training.

In the hedgerow country of Normandy, the countryside is a checkerboard of small fields of uneven shape enclosed by hedgerows. One regimental commander ordered his two attacking battalions to advance on an azimuth of 270 degrees. After the attack jumped off, both battalions lost direction. Some time later, one of them was attacking on an azimuth of 180 degrees, the other on an azimuth of zero. This unhappy situation was discovered when each battalion called for an artillery concentration on the position occupied by the other. When these requests reached the fire-direction center, the battalion commanders were promptly notified. As a direct result of this occurrence, the advance on that front was delayed by more than 24 hours .

A battalion commander cannot fight his battalion from a command post. He must keep close to his assaulting companies if he is to have coordination. While it is seldom necessary for the battalion commander to be actually in the assault, he must be close enough to reach his assault companies whenever necessary. When a crisis arises or when the battalion halts for the night, the battalion commander must not leave everything in the hands of the leading company commanders. He must go forward to supervise and coordinate their activities.

A battalion commander in France reported that he was pinned to the ground, his battalion stopped. He was ordered to engage his reserve company. He couldn't find the company. He called it by radio; he sent out messengers; finally he sent out staff officers; to no avail. The reason why he

could not find his reserve company was that he was too far to the rear. This incident might well be regarded with incredulity. Nevertheless, it did happen. Of course, when his attacking companies bogged down, the battalion commander should have gone forward to them with all possible speed.

In rapidly moving situations, battalions often halt for the night in immediate contact with the enemy. To resume the attack at dawn is a complicated and difficult procedure. Many things must be done during the night, and at the same time the troops must get the maximum rest possible under the circumstances. This type of situation must be realistically simulated in training and practiced time and again.

Battalions must, above all, be able to attack on time. Enemy prisoners of war, both officers and noncommissioned officers, have commented on the frequent failure of our infantry to follow promptly our splendid artillery fires. A battalion which is 15 or 20 minutes late—and some have been—in crossing the line of departure has already lost its best chance of taking its objective on schedule.

Another fault of some battalion commanders is overcaution. They are afraid of isolating themselves and, if they seem to be moving faster than adjacent units, will go a hundred yards or so and halt. Then, in 15 minutes at the most, the enemy begins to dump mortar shells in their laps.

Many officers do not appreciate the sustaining power of an infantry battalion. If a formation in reasonable depth is adopted, the battalion is very powerful and cannot easily be destroyed. It can protect its flanks and its rear and, even if cut off, can hold out for a long enough time to affect the general situation very favorably. These capabilities justify aggressiveness on the part of battalion commanders. They should vigorously exploit soft spots and never give way to the temptation to stop and wait for an adjacent unit to catch up.

Battalion commanders must learn more about artillery during training. Most of our artillery is accurate and dependable, and is present in ample quantity. The infantry,

in general, is slow to take advantage of it. Men must be required to close in on the fires of the artillery—to "lean against" them. When these fires lift, leaders must take their men *on the run* into the neutralized area. If they do not, the artillery preparation will have been comparatively ineffective.

One very effective type of artillery fire used in France is called a "serenade." It consists of the firing of one or two rounds by every gun in the division artillery, the corps artillery, and any attached artillery, all on a single target area and so timed that the rounds of all guns impact simultaneously. The effect cannot be adequately described.

Battalion commanders must keep themselves informed of the condition of their companies. In a long fight, a skillful battalion commander can often restore a badly mauled company by passing his support company into the assault and getting the depleted company out to be calmed, reorganized, and at least to some extent rested.

A battalion in France was ordered to seize a hill mass which afforded the enemy observation not only over the nearby country but clear down to the landing beaches a good many miles away. As the battalion pushed ahead, its commander conferred with the artillery liaison officer. He pointed out his objective, explained its value to the enemy, and arranged a series of artillery concentrations to be laid down around the objective, after its capture, to beat off the inevitable counterattacks. The battalion took the objective and stopped the counterattacks that followed.

Later this battalion, along with other battalions, was required to push down the heavily wooded slope of this hill mass. After fighting its way down the slope and through a series of strongly organized reverse-slope positions, the battalion commander discovered a bridge which he considered a key point. He determined to capture it. The reverse-slope positions were captured in the late afternoon. The bridge was taken about dark. The battalion had done an excellent job, and no criticism could have been offered of its commander if he had called an end to the day's work at this point.

However, there was a small village not far from the hill in the direction of the enemy. The battalion commander feared that, if the Germans were allowed time during the night to prepare this village for defense, he would be faced at daylight with the difficult and expensive task of dislodging the enemy. So he ordered a night attack with a limited objective and took the town.

The determination and forehandedness of this battalion commander were not wasted. Following the capture of its hill objective, the battalion beat off 15 German counterattacks, thanks very largely to the artillery concentrations which had been arranged before the battalion commenced its attack. The entire action was a remarkable demonstration of leadership, involving anticipation, aggressiveness, and tenacity. That kind of battalion commander wins wars.

REGIMENTS

The overcaution which, as previously noted, is a failing of some battalion commanders, is a shortcoming of regimental commanders also. They worry about their flanks and try to maintain a linear formation in battle. The desirability of alining units abreast is a fallacy that lingers on among officers who ought to know better.

During a continuous battle, the regimental staff must be so organized as to permit effective night preparation for the next day's attack. Local security, antitank weapons, food, water, ammunition, evacuation, and timely orders are among the things that must be remembered, in order to insure combat effectiveness the following day. A regimental staff that is too worn out in the evening to get anything done at night is not functioning properly.

Regiments have a tendency to overlook the necessity for giving the troops hot food whenever possible. Division commanders should insist that regimental commanders see that this is done whenever the situation permits.

Regimental commanders can help keep their units in good combat condition by judicious rotation of battalions in reserve. Many an able battalion commander who might otherwise have got into serious difficulties has been rescued by a

regimental commander wise enough to take the battalion out of action long enough to permit a few hours' undisturbed sleep.

It is doubtful whether any man 48 years of age or older has the physical or nervous strength required of a successful regimental commander in combat. There may be exceptions to the rule, but to gamble on an exception is poor policy.

CHAPTER 3

Infantry-Artillery-Tank Team in the Attack

In 1917, at Cambrai on the Western Front, 378 British tanks—a "secret weapon"—led 6 infantry divisions in a large-scale attack. The terrain over which the attack was made had been carefully selected. Surprise was achieved. Initially, the Germans fell back in confusion. Yet the battle was not a major victory, partly because the infantry failed to follow through closely to consolidate the gains. The same tactical error has been made many times in the present war.

The tank in 1917 was designed to destroy the enemy foot soldier, especially the machine-gun crew, and to create lanes for infantry through barbed wire. These things it accomplished by crushing power, shock action, and its own machine guns, while protected by its armor from enemy small-arms fire.

Today's faster, better protected, and more heavily armed tank is, as in the previous war, more effective against foot troops than against other types of targets. The principle that the infantry must follow closely to occupy ground overrun by tanks not only remains unchanged, but must continually be re-emphasized. Defenses against tanks, however, have been improved so much that, where an antitank defense is well prepared (or where natural obstacles restrict tank maneuver), the role of infantry in an infantry-tank attack is one which was largely unnecessary in 1917. In such a situation, tanks cannot lead the attack. Instead, infantry and its supporting weapons must neutralize concentrations of antitank guns and often clear a path through

antitank obstacles or mine fields as well. Only when this has been done is it possible for the tanks to resume their role as the shock element in the attack.

Needless losses of men and equipment have been sustained by our forces because this fact was not fully understood. Tanks have been frittered away by committing them in inadequate force, by assigning them improper missions or missions over unsuitable terrain, and by neglecting to assure adequate cooperation by the infantry. Some infantry commanders have habitually called on attached tanks, singly or in small groups, to knock out enemy positions at the first sign that the foot troops were being delayed. This action may be premature unless it is known that the target is a remunerative one and that the situation is favorable for the use of tanks. Such tactics are wasteful of tanks without offering reliable assurance of success.

II

In the infantry-artillery-tank team, each arm is indispensable, but no one element alone is capable of success. To achieve the timely, balanced interplay of the three arms attacking as a team, coordination of plans in exhaustive detail among their commanders is essential. This is true not only among large units, but among smaller ones as well. An infantry platoon and an attached tank section (usually the smallest tank element attached) must work in the closest coordination.

Mutual understanding of the capabilities and limitations of each arm is absolutely prerequisite to this kind of cooperation. The infantryman, for example, may have an exaggerated idea of the tank's ability to maneuver while exposed to the fire of antitank guns, and he may forget that a tank is handicapped by limited vision after it has been forced to "button up." The tankman, on the other hand, frequently lacks appreciation of the time and space factors required by infantry in movement on the battlefield. Both the infantryman and the tankman may need reminding of the flexibility of the supporting artillery

fires which are available to them and the speed and accuracy with which these fires can be delivered when their need has been foreseen and they have been planned in advance. Infantry-tank units that are to fight together should be given an opportunity to train together before going into action. Ignorance and misconceptions of the capabilities of the various arms can and must be overcome during this training and in battle rehearsals.

When attacking with tanks, the infantry has the missions of:

1. Seizing ground from which the tanks may attack.
2. Forming, together with the artillery, a base of fire in support of leading tank echelons.
3. Reconnoitering and breaching antitank mine fields and tank obstacles.
4. Destroying or neutralizing hostile antitank guns.
5. Protecting the tanks against close-in attack by enemy foot troops.
6. Continuing the attack when leading tanks are stopped by impassable terrain features or enemy antitank measures.
7. Mopping up enemy remaining on the objective after it has been attacked by the tanks.
8. Organizing the defense of the captured position and protecting the reorganization of the tank elements.

When attacking with infantry, tanks have the missions of:

1. Delivering supporting fire against targets dangerous to either infantry or tanks.
2. Creating paths for the infantry through wire barriers.
3. Supporting the infantry by fire when leading tanks are stopped by the terrain, by obstacles, or by antitank weapons.
4. Neutralizing or destroying hostile automatic weapons.
5. Dominating the objective pending mopping-up operations by the infantry.
6. Repelling counterattacks and, especially, providing antitank defense on the captured position pending its consolidation by the infantry.

Large tank units will frequently have as missions the neutralization of hostile reserves and artillery and the destruction of enemy command, communication, and supply installations. On such missions, infantry will be attached to tanks, rather than tanks to infantry, and the armored units will often be substantially "on their own." These missions do not, therefore, fall within the scope of this discussion.

III

A working knowledge of the characteristics of tanks, the organization of tank units, the means and procedure of infantry-tank communication, and the fundamentals of tank tactics are required of an infantryman for efficient performance of his duties during an infantry-tank attack.

The standard tank battalion (see fig. 1) is an administrative and tactical unit with supply, evacuation, and maintenance facilities for limited action. It has a headquarters and headquarters company, a service company, a medical detachment, three medium tank companies, and a light tank company. Both medium and light tank companies are composed of a company headquarters and three platoons of five tanks each. The headquarters company has a company headquarters, a reconnaissance platoon, a mortar platoon of three 81-mm mortars mounted in half-tracks, and an assault-gun platoon of three 105-mm howitzers mounted in medium tanks. The headquarters section of the medium tank company has a 105-mm assault gun. The battalion mortar platoon carries a large amount of smoke ammunition. Each separate tank battalion has an additional tank for the use of an artillery forward observer.

The tank battalion is ideally employed in mass. When operating with an infantry regiment, it will usually be employed on a front of 800 to 1,500 yards. The regimental commander may attach his entire tank strength to a single infantry battalion when the regiment attacks in column of battalions, when a single battalion has the mission of seizing the regimental objective, or when the regimental zone of action is so wide that the tank unit would be subject

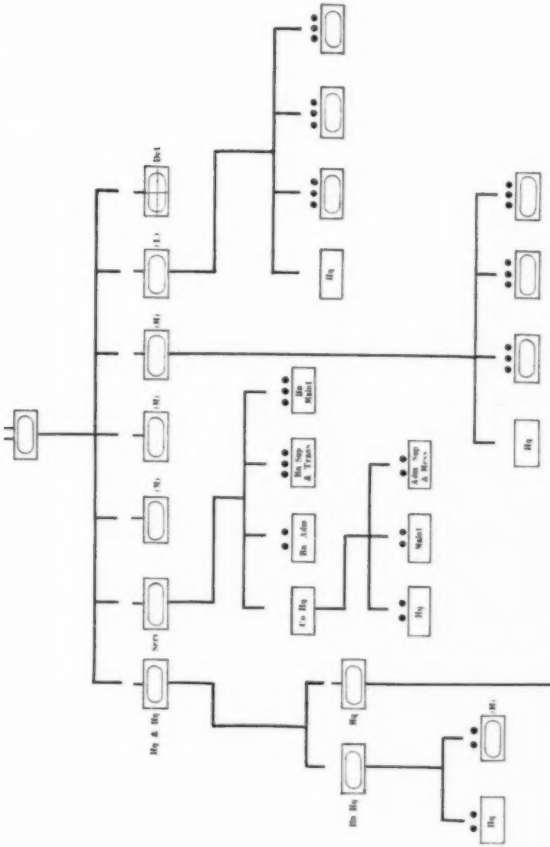

FIGURE 1.—Organization of the standard tank battalion.

to excessive dispersion. In this last case, the tanks should be employed on the most favorable terrain and against the most decisive objective. However, a tank company will often be attached to an infantry battalion, a tank platoon to a rifle company, and a tank section to a rifle platoon.

Tanks are most effective in rolling country affording cover for base-of-fire elements in the attack. Swamps, unfordable streams, steep banks, dense forests, large stumps, and boulders restrict their maneuver. High vegetation limits their vision. Fog, smoke, and darkness, although sometimes advantageous because of the concealment they afford in the approach, nevertheless reduce tank speed and impair tank gunnery.

The principle of fire and maneuver is of the same vital importance to tanks as it is to infantry. To advance a tank unit without fire support is to put every tank in danger from undiscovered enemy antitank guns. Therefore, when any elements of the unit advance, the remainder of the unit covers ("overwatches") the movement from defilade or hull-defilade positions. Tanks commence firing at known or suspected point targets before the maneuvering elements move out, but do not attempt to cover the entire objective with fire. Except in this respect, attacking tanks carry out the principle of fire and maneuver exactly as do infantry units.

Tanks alone are incapable of destroying all resistance on a well-organized position. Therefore they never cruise around on an objective. Such action would expose them to antitank-gun and artillery fire without the probability of achieving results worth the losses they would risk. Instead, they take defiladed positions from which they accomplish their mission through domination of the objective by fire, destroying any enemy who disclose themselves. It is the infantry who must mop up, take prisoners, and consolidate the position.

The tank gun (75- or 76-mm; 37-mm in some light tanks) can deliver both direct and indirect fire. The 75-mm gun can fire six rounds per minute for short periods. In prolonged firing, the accumulation of gas within the tank,

even with all hatches open, forces the adoption of a slower rate. The tank gun is most accurately fired when the tank is stationary, although the gyro-stabilizer makes possible reasonably effective fire from a moving tank. Also, a moving tank may make frequent halts just long enough to permit the gunner to get off a well-aimed round.

The machine guns, an equally important part of tank armament, are fired from moving tanks at enemy rifle groups and at machine-gun and antitank-gun crews at ranges less than 200 yards. Machine guns of a stationary tank in hull defilade are fired at ranges up to the limit of visibility. The coaxial machine gun, fired by the tank gunner, is equipped with a telescopic sight and can be fired with greater accuracy than the bow gun, which is sited at the bow gunner's waist. The bow gunner has no way of aiming other than by observing through his periscope the effects of his bursts, which he must "roll" into the target.

Flame throwers, used against bunkers and pillboxes, are mounted in some tanks. The tankdozer (tank with bulldozer blade), used for breaching obstacles, filling antitank ditches, and digging tanks into hull defilade, may also be considered as a weapon in that it facilitates the advance against enemy positions.

Tanks are vulnerable to close-in attack by foot troops using rocket launchers, grenades, string mines, and other individual antitank weapons, particularly at stream crossings and while passing through villages, woods or jungles, or narrow defiles. Protection by friendly infantry against such attack is essential.

When a tank comes under heavy fire, it closes its hatches. Vision is then limited to that obtainable through the periscopes and sights and is usually further obscured by dust and smoke. Location of new targets becomes especially difficult. Some new tanks are equipped with improved direct-vision devices which substantially increase the tank crew's field of vision.

Intertank communication is by voice radio. Platoon commanders' and company commanders' tanks are equipped with the SCR 508. All other tanks have the similar SCR 528. The company liaison corporal has the less powerful SCR 510 in a ¼-ton truck. The artillery forward observer's tank is equipped with an SCR 608. For tanks operating with infantry, seven SCR 300s per tank company are now authorized. These are installed in appropriate tanks and furnish a channel of communication with infantry companies and infantry battalion headquarters through the battalion command net.

IV

Since the terrain over which the attack is to be made and the state of the enemy's antitank defenses determine the role of the tanks in an infantry-tank attack, reconnaissance as thorough as the situation permits is fundamental. The danger of sending either tanks or infantry on a mission hastily conceived on the basis of superficial information of the enemy and of the terrain cannot be overemphasized.

The tank commanders must be furnished with all available information of the enemy and of the terrain immediately upon reporting to the commanders of units to which attached. To this end, infantry reconnaissance should include exact locating of mine fields, tank obstacles, and antitank guns. In addition, time must be allowed for reconnaissance by tank personnel. Not only tank company commanders, but tank platoon leaders and, when possible, tank commanders and tank drivers should view the terrain over which it is proposed to maneuver. Dismounted tank personnel may accompany infantry patrols on reconnaissance.

Without detailed reconnaissance and extended observation of the enemy position, it is almost impossible to locate antitank weapons. Tank units expect to meet some resistance from antitank guns and are prepared to destroy it. Their limited vision, however, makes it difficult to locate

such guns after the attack has been launched. Two or three well-concealed antitank guns can inflict severe damage on an attacking formation. Lack of information of enemy antitank guns may lead the tank commander to assume that no *massed* antitank-gun defense opposes him. He may guard against the possibility of there being such defense by recommending that the infantry follow his tanks very closely. He will frequently request, in addition, artillery time-fire concentrations (through which tanks can move without damage) on possible antitank-gun locations as his tanks advance.

Natural tank obstacles are seldom difficult to locate. Man-made obstacles are usually concealed. However, the real problem is breaching them to permit the passage of tanks. Where effective obstacles exist, tanks cannot lead the attack.

Extensive use of antitank mines is often the gravest restriction on tank maneuver. Without constant observation of terrain occupied by the enemy, it is difficult to ascertain the presence of a mine field. Low-altitude aerial observation may disclose the pattern of a field, but failure to observe such a pattern cannot be the basis for assuming that no mines are present. Tank units must take calculated risks of encountering mine fields. When hostile fire prevents breaching a field by other methods, a demolition snake may be used to blast a passage. The snake is a torpedo assembled in sections up to a total length of 400 feet. It is pushed into place by a tank, to which it is fastened by a bow attachment which is operated from within the tank to release the torpedo when it is in the desired position.

When the infantry commander has given the commander of an attached tank unit all available information of the situation and the terrain, his next step is to familiarize the tank commander with the mission of the supported unit. The tentative plan of the infantry commander must be made known to the tank commander at this time. Simplicity and flexibility should characterize the plan of a combined attack. Reasonable delays to assure a sound plan and

complete understanding of it by all the participating units are to be preferred to a hasty attack which may fail through lack of coordination.

The infantry and tank commanders should make every effort to remain near each other during combat. Their personal contact facilitates successful solution of unexpected combat situations and makes possible the continuous development of plans for future concerted action. The commander of an attached tank unit is a special staff officer on the infantry commander's staff, and, regardless of their respective rank, the infantry commander must be willing to accept and act on the recommendations of the tank commander.

If SCR 300s are not available for the tank unit, communication between infantry and tanks after the attack has commenced must be improvised, because present infantry radio sets do not net with tank company radios. (However, the tank-mounted SCR 508, 510, and 528 do net with the SCR 600 series used by the artillery.) A liaison set for infantry use can usually be spared from a vehicle in the tank unit, possibly an SCR 510 from the company maintenance section or the battalion mortar platoon. In addition, the liaison corporal of a tank company normally accompanies the commander of the infantry unit to which his company is attached, carrying an SCR 509 (which is the SCR 510 operated on batteries instead of a power unit). Close communication between tanks and small infantry elements is effected by a telephone mounted on the rear end of a tank and connected to the tank's interphone system, but the phone cannot be used without hazard while the tank is under fire. Long bursts of tracer may be used by infantry during the attack to point out new targets to tanks, whose crews are trained to be alert for tracer fire. Firing of rifle smoke grenades is an effective means of target designation.

Regardless of difficulties which may be encountered, reliable communication between infantry, artillery, and tank units must be established before a combined attack is launched. Otherwise, the attack might almost as well be planned and executed by the arms independently.

V

Four conditions are indispensable to a successful infantry-tank attack with tanks leading. They are: (1) suitability of the terrain for tanks; (2) neutralization of enemy antitank guns, if massed in the defense; (3) breaching or bridging of antitank obstacles; (4) gapping and marking of lanes through antitank mine fields. The application of these (and other) principles to a specific situaiton is illustrated in the following example of planning for such an attack.

The 2d Battalion, 1st Infantry, is the exterior battalion on the left flank of a division attacking northward. (See fig. 2.) The 1st Battalion is on its right. The division reconnaissance troop is reconnoitering and observing on the left flank of the division. The mission of the 2d Battalion is to seize HILLS 4 and 5.

Several hours ago, when the regiment had reached a line running approximately east and west, and passing along the edge of the woods south of HILL 1, Company B (a medium tank company), 771st Tank Battalion, was attached to the 2d Battalion.

When Captain Company B (tank) reported to Lieutenant Colonel 2d Battalion, he was informed that the enemy had been resisting strongly; that he was believed to be occupying all the high ground to the north of the battalion; that nothing was known of his antitank weapons or other antitank defense measures; that good observation of the terrain between the battalion and HILL 5 was not available, but that maps and aerial photographs of the area were on hand. These were given to Captain Company B (tank), who also was informed of the disposition of friendly troops and of the battalion mission.

Lieutenant Colonel 2d Battalion added that he planned to attack HILL 1 immediately, in order to obtain better observation to the north before continuing the attack. Companies E and F were to constitute the attacking infantry echelon, with Company E on the right. He assigned HILLS 1, 3, and 4 and the west half of HILLS 2 and 5 to the zone of

action of Company F, and the rest of the battalion zone to Company E.

Lieutenant Colonel 2d Battalion attached the 1st Platoon, Company B (tank), to Company F to assist in the capture of HILL 1. He ordered Captain Company F to attack the hill from the south and southwest and ordered Captain Company E to attack up the draw in the east half of the battalion zone at the same time. He asked Captain Company B (tank) for tentative recommendations for employment of his tanks in the continuation of the attack after the capture of HILL 1.

Studying the maps and aerial photos, Captain Company B (tank) noted that the terrain north of HILL 1 appeared to be rolling, with sufficient cover for tank action. In Company E's zone, the dense woods and deep draw precluded the use of tanks, but elsewhere the terrain was fairly open, although it afforded only limited space for maneuver. He decided that, given strong artillery support, his tanks would find the space adequate. Knowing nothing at all of possible enemy antitank guns, obstacles, or mine fields, he decided to recommend tentatively that his tanks lead the attack from HILL 1, provided the formation should be given flexibility by having infantry follow the leading tanks closely, prepared to move ahead should the tanks be held up, and provided further that, as a safeguard against hidden antitank guns, artillery time fire against likely antitank-gun positions should be delivered on and ahead of the first wave of tanks. He also decided that a small number of light tanks should accompany the infantry in the second wave of the attacking echelon, to assist in mopping up pockets of resistance, and that he would recommend that assignment of a light tank platoon for this purpose should be requested through the regimental commander.

Captain Company B (tank) further took the precaution of requesting that the tank battalion commander release to him a tankdozer and two demolition snakes. He then made his tentative recommendations, which Lieutenant Colonel 2d Battalion accepted pending a visual reconnaissance of the

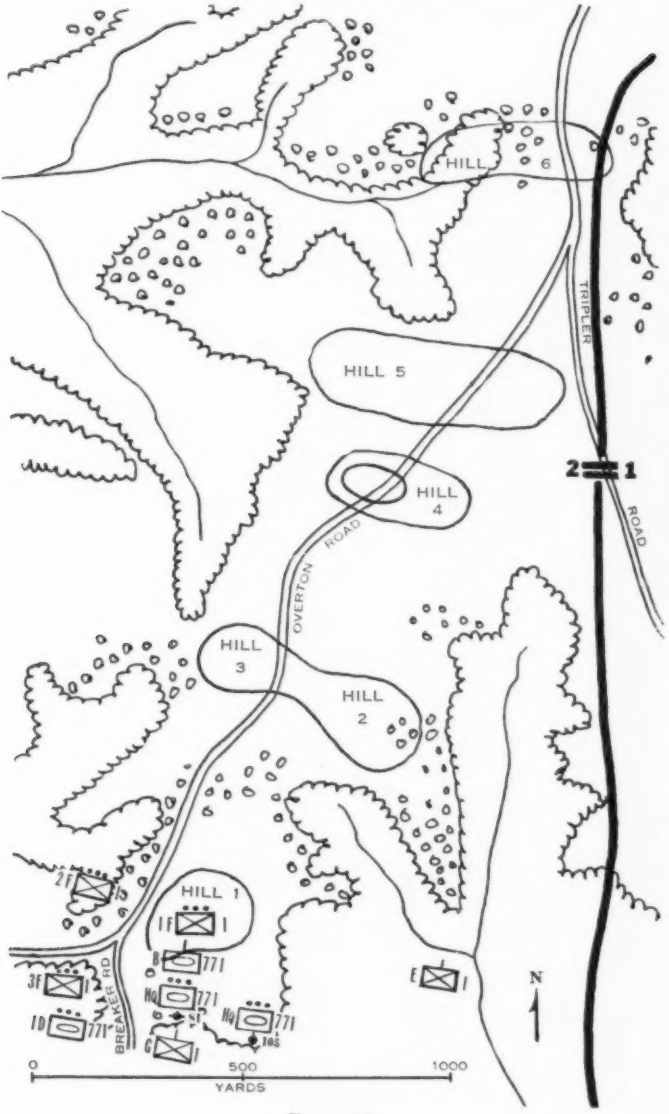
HILL 6
TRIPLER
HILL 5
2
1
HILL 4
ROAD
OVERTON ROAD
HILL 3
HILL 2
HILL 1
BREAKER RD
N
0
500
1000
YARDS

FIGURE 2.

terrain. Finally, Captain Company B (tank) outlined to the artillery liaison officer the artillery missions he desired in support of the tank attack.

* * *

HILL 1 has now been captured (fig. 2) and is being consolidated by the 1st Platoon, Company F. The 2d and 3d Platoons, Company F, are in the woods west of HILL 1 and BREAKER ROAD. Company E is reorganizing in the draw in the right portion of the battalion zone and is prepared to continue the attack in the direction of HILL 5. Company G is in reserve in the woods south of HILL 1. The 2d and 3d Platoons, Company B (tank) have moved to the reverse slope of HILL 1, joining their 1st Platoon, which halted there during the attack of the hill. The weapons of the Weapons Platoon, Company F, and of Company H are being displaced to HILL 1 and to covered positions south of HILL 1. The assault-gun and mortar platoons of the tank battalion have also occupied positions south of HILL 1, the regimental commander having assigned them missions in support of the 2d Battalion. The 1st Platoon, Company D (light tank) has been attached to Company F, and is now in the woods southwest of the OVERTON-BREAKER road junction. The artillery is registering on HILLS 4, 5, and 6.

Lieutenant Colonel 2d Battalion is on the northwest slope of HILL 1, with the infantry company commanders, Captain Company B (tank), the artillery liaison officer, and Lieutenant 1st Platoon Company D (light tank). They are discussing detailed plans for the attack on HILL 5.

LIEUTENANT COLONEL 2d BATTALION:—"This terrain looks just about the way we figured it from the photos. The only new feature I can see is that antitank ditch in the low ground halfway between HILL 1 and HILLS 2 and 3. I wouldn't be surprised to find some antitank mines, too, in that area. How about that ditch, Captain Company B (tank)? Can your tankdozer do a job on it?"

CAPTAIN COMPANY B (TANK):—"I'm quite sure it can, sir."

LIEUTENANT COLONEL 2d BATTALION:—"How long will it take to get the 'dozer up?"

CAPTAIN COMPANY B (TANK):—"Not long. It's with my 3d Platoon, which is moving up now. Incidentally, those two snakes I asked for are being assembled by my battalion in the rear. We'll have them here, in case we run into a mine field."

LIEUTENANT COLONEL 2d BATTALION:—"I plan to have two platoons of Company B (tank) constitute the first wave of the attack.

"Two platoons of Company F, with the light tank platoon attached, will form the second wave of the attacking echelon, in the left portion of our zone, moving out when the tanks of the first wave reach the ridge formed by HILLS 2 and 3. Company E, with two platoons in the attacking echelon, will attack in the right portion of the zone at the same time.

"The support echelon—one platoon of Company B (tank) and one platoon of Company F— will be in support on HILL 1 initially, each platoon under command of its own company commander.

"Company G will be in battalion reserve southwest of HILL 1.

"Company H will support the attack initially from HILL 1.

"Our artillery will smoke HILLS 4 and 5 on call. It will fire impact HE initially on HILL 3, shifting to time fire when the first wave of tanks attacks the hill. Subsequently, it will deliver time fire on located or suspected hostile antitank guns on or near HILLS 4 and 5, lifting on call.

"The Mortar Platoon and Assault Gun Platoon of the tank battalion will answer calls for fire support from Company B (tank).

"Company B (tank) will dominate HILLS 2 and 3 until relieved by Companies E and F. It will then attack and dominate HILL 4, until relieved by Company F. It will then attack HILL 5. The 2d and 3d platoons, Company B (tank),

will be supported by the two leading platoons of Company F until HILL 4 is taken. In the attack on HILL 5, the leading platoons of both Companies E and F will support the tanks. One platoon of Company A (tank), from the 1st Battalion on our right, will coordinate with us in the attack on HILL 5.

"Upon the capture of HILLS 4 and 5, Companies E and F will reorganize and defend within their respective zones. Company B (tank) will continue to dominate HILL 5 until relieved by my order, after which it will rally in the draw south of HILL 5.

"I plan to remain on HILL 1 initially, and thereafter follow the advance of Company F."

CAPTAIN COMPANY B (TANK):—"Will I get those artillery missions we discussed in connection with my recommendations for the tanks?"

ARTILLERY LIAISON OFFICER:—"We have completed registration, and your supporting fires are all planned.

"At H minus five minutes, a concentration of impact HE on HILL 3 and the edge of the draw north of the hill. This will change to time fire on your call as the tanks approach the hill.

"I understand your tank mortar platoon is going to smoke observation on HILL 4 and your support platoon of tanks is going to cover HILL 2 by fire beginning at H hour. We'll continue time fire until the tanks are dominating HILLS 2 and 3, while Company H's 81-mm mortars fire smoke to screen observation from the open ground west of HILL 3.

"From the time the tanks move out from HILLS 2 and 3 until they are in position to dominate HILL 4, the artillery will deliver time fire on located or suspected hostile antitank guns on HILL 4. After that, we will put time fire on HILL 5, concentrating on the east and west flanks of the hill, until the tanks are in position to dominate it.

"We have all these missions planned. In addition, we will be prepared to fire additional smoke missions if you should need them.

"Our normal forward-observer parties will be with Companies E and F. We will also have a forward observer with the first wave of tanks. How can you arrange communication with this observer during the attack, Captain Company B (tank)?"

CAPTAIN COMPANY B (TANK):—"The forward observer's tank is equipped with an SCR 608. I have arranged through our battalion communication officer for a separate channel on which his set will net with the SCR 508 in my command tank."

ARTILLERY LIAISON OFFICER:—"That will be fine. In an emergency, he can use the infantry-tank radio net to relay calls for fire support through the forward observers with the rifle companies or he can relay them through me, at the battalion commander's OP. With this observer in the first wave, we will be able to bring fire on targets beyond the objective without delay, as soon as the tanks are dominating the hill."

CAPTAIN COMPANY B (TANK):—"The only thing that worries me is running unexpectedly into a lot of antitank guns. It is very important that the infantry stay close to my leading tanks. If the tanks are stopped by either guns or mines, we can get smoke from the artillery, the mortars, or the assault guns to screen the tanks while they are finding some cover. Meantime the infantry can be moving ahead to clear a way for us. Of course, with the help of artillery time fire, our tanks can take care of a good many antitank guns. The time fire neutralizes them, while we move up and destroy them."

LIEUTENANT COLONEL 2d BATTALION:—"If there are no questions about the plan of maneuver, go ahead and complete your reconnaissance and detailed planning. I'll issue my attack order here in 50 minutes."

Immediately after the conversation recounted above, Captain Company B (tank) assembles his platoon leaders and points out to them the dominant terrain features in the zone of action. Each platoon leader, using field glasses, makes a careful reconnaissance of the terrain.

Captain Company B (tank) and Lieutenant 1st Platoon Company D (light tank) next discuss with the infantry company commanders the details necessary to insure complete coordination of all elements in the forthcoming attack. They make certain that the missions and responsibilities of the infantry and tank components of each attacking wave are clearly defined, and that the channels of communication to be used between separate echelons and between waves are clearly understood.

The roles of the attacking elements are planned as follows:

First Wave (two medium tank platoons). To advance by fire and maneuver from HILL 1 to HILL 5, destroying enemy personnel and materiel and dominating successively HILLS 2-3, 4, and 5, until the arrival of the infantry on each hill.

Second Wave (two rifle platoons, one light tank platoon). The rifle troops to lead initially, neutralizing by fire or by fire and maneuver hostile antitank guns not disposed of by the first wave, and be prepared to pass through the first wave if it should be held up. The light tanks to support the infantry all the way to the objective, passing through the infantry, when necessary, to dispose of machine guns or other weapons delaying the infantry's advance. The tanks to advance by the most advantageous routes, regardless of the routes chosen by the infantry, but to be constantly alert for signals from the infantry requesting assistance. Both infantry and tanks to move aggressively, mopping up enemy resistance not liquidated by the first wave, and to do this speedily in order that the distance between the first and second waves does not become excessive. This distance, however, to be governed by incidents of the terrain, rather than in terms of a fixed number of yards.

Support Echelon (one rifle platoon, one medium tank platoon). The rifle platoon, under the direct control of Captain Company F, to be employed by him as the situation dictates. The tank platoon to support by fire the advance of the first wave of tanks and to perform other missions as directed by Captain Company B (tank).

VI

In an infantry-tank attack, the infantry forms the first wave whenever any of the following conditions exists: (1) terrain unfavorable for tanks; (2) extensive mine fields; (3) strong enemy antitank obstacles or massed antitank-gun defenses.

In this type of attack, the general missions of the attacking elements are as follows:

First Wave (infantry). This wave follows the artillery support as closely as possible, and seizes the objective. The troops are alert to neutralize antitank guns which have not been destroyed by the preparatory fires. This wave includes personnel whose primary duty is to gap and mark lanes through mine fields.

Second Wave (tanks, plus a small detachment of infantry). The tanks follow the first wave by bounds (usually at distances between 500 and 1,000 yards) and support it by fire or by fire and maneuver, usually from flank or hull-defilade positions. When necessary, some of the tanks may pass through the first wave to insure that the supported infantry gains the objective. The infantry detachment included in this wave provides the tanks with local support and security.

Support Echelon (tanks and infantry). Both tanks and infantry support the attack by fire or by fire and maneuver. Both are prepared to oppose counterattacks, to pass through preceding waves to continue the attack, or to make a flanking attack. The secondary mission of the third wave is to mop up and secure the objective.

The following example of an infantry-tank attack with infantry leading indicates how the above principles might be applied to a specific situation.

The 2d Battalion, 1st Infantry, on the left flank of a division attacking northward, has reached the line extending approximately east and west through HILL 5, as shown in Figure 3. The 2d Battalion and the 1st Battalion on its right are unable to advance because of heavy fire from HILLS 6, 7, and 8, and from another hill (not shown in fig. 3) 800 yards southeast of HILL 7, in the zone of the 1st Battalion.

Ground reconnaissance has revealed that the approaches to HILLS 6 and 7 are heavily sown with antitank and antipersonnel mines; in addition, the wooded draw west of HILL 6 contains a series of tank traps protected by automatic weapons. Because of these tank obstacles, it is essential that infantry troops lead the attack and neutralize the enemy's antitank defenses before the tanks advance.

The regimental commander has ordered the 3d (reserve) Battalion to envelop the hostile right flank, capture HILLS 6 and 7, and prepare to continue the attack to the north. He has detached Company B (tank) from the 2d Battalion and has ordered it attached to the 3d Battalion for the purpose of supporting the 3d Battalion's attack. Two battalions of field artillery are to support the regiment's attack, giving priority of calls for fire to the 3d Battalion. The division has ordered smoke on HILL 8 to blind enemy observation from that point during the attack. The 2d Battalion is to revert to regimental reserve.

Lieutenant Colonel 3d Battalion, after making a reconnaissance and considering the recommendations of his staff officers, Captain Company B (tank), and the artillery liaison officer, developed the following plan of attack:

The battalion, in column of companies, Company I leading, followed by Company K and Company L (in reserve), to move by the route shown in Figure 3 to a final assembly area in the woods southwest of the line now held by the 2d Battalion and thence through the wooded draw to attack HILL 6 from the west. When HILL 6 has been captured, to continue the attack and capture HILL 7.

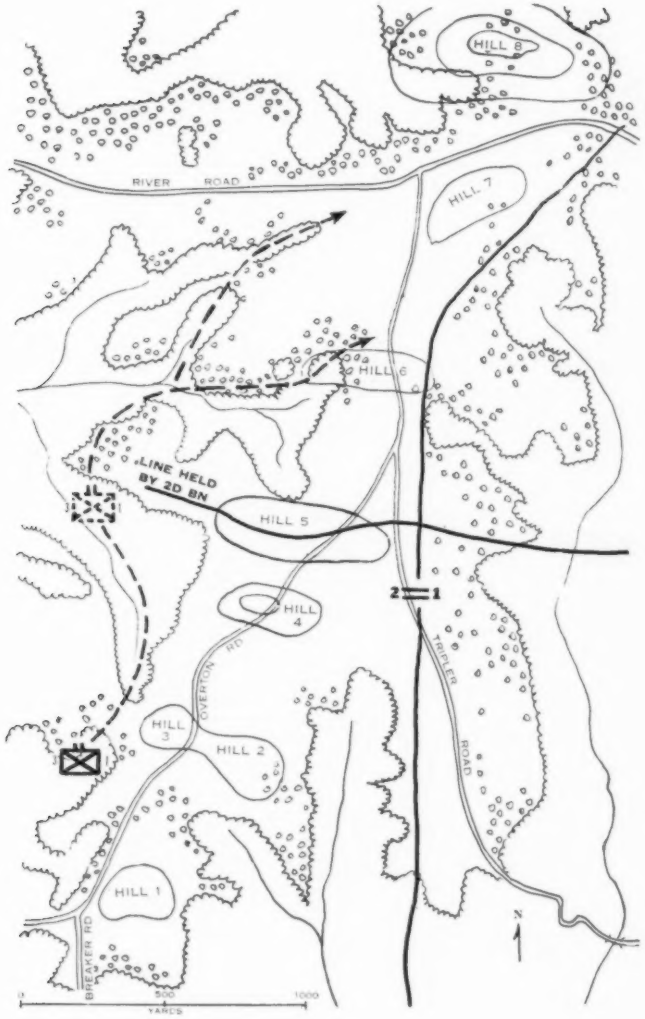
HILL 8
RIVER ROAD
HILL 7
HILL 6
LINE HELD BY 2D BN
HILL 5
2
1
HILL 4
OVERTON RD
TROLLER ROAD
HILL 3
HILL 2
HILL 1
BREAKER RD
N
0
500
1000
YARDS

FIGURE 3.

Company M to support the attack from positions in the 2d Battalion's zone on the northwest slope of HILL 5. When HILL 6 is captured, to displace forward and protect the reorganization of the rifle companies, from positions in the vicinity of HILL 6.

The Antitank Platoon, from positions on HILL 4, to be prepared to fire on tanks or located weapons installations on HILL 6. When HILL 6 is captured, to displace to HILL 6 and take up positions to repel a counterattack by enemy tanks.

Company B (tank) to support the attack initially by fire from hull-defilade positions on HILLS 4 and 5. When HILL 6 is captured, the 1st and 2d Platoons to displace to HILL 6 and protect the reorganization of the infantry. The 3d Platoon, in support, prepared to repel counterattacks from the west, to remain on HILL 4 until ordered to displace.

The artillery to deliver preparatory fires in the draw west of HILL 6, shifting to HILL 6 when the rifle companies leave the final assembly area. The fires to shift from HILL 6 to HILL 7 on call of the leading rifle company. Concentrations to be prepared for firing on call upon the woods northwest of HILL 6.

* * *

HILL 6 has now been captured, and the supporting weapons have displaced forward. Lieutenant Colonel 3d Battalion, Captain Company B (tank), and the artillery liaison officer are on HILL 6, discussing plans for the continuation of the attack to HILL 7.

CAPTAIN COMPANY B (TANK):—"Sir, my 1st and 2d platoons are now up with us and firing on HILL 7. They are located so that they can also cover the approaches to this hill (HILL 6) from the west. My 3d platoon is still on HILL 4, prepared to fire on targets in our zone of action.

"What is your plan for continuing the attack?"

LIEUTENANT COLONEL 3d BATTALION:—"Company L will move through those woods to the northwest of us and attack HILL 7 from the west.

"Company I will support the attack by fire from its present position on this hill.

"Company K, in reserve, from its present position in the draw to the west of us, will protect the left flank of the battalion, maintain contact with Company L, and be prepared to assist Company L by flanking action.

"Company M will continue to support the attack from positions on this hill and will be prepared to defend against a counterattack from the west or northwest.

"The Antitank Platoon, from its positions on this hill, will fire on definitely located antitank guns and machine-gun positions on HILL 7 and will also be prepared to meet a tank attack from the northwest.

"Now, what assistance can you give me with your tanks?"

CAPTAIN COMPANY B (TANK):—"Colonel, we can support the attack of Company L initially by the fire of the two platoons now on this hill. When Company L has captured HILL 7 or when all enemy antitank defenses have been neutralized, these platoons can advance to HILL 7 and protect your reorganization. My 3d platoon can then displace to HILL 6 and be in position to cover the two forward tank platoons and to protect the left flank of the battalion."

LIEUTENANT COLONEL 3d BATTALION:—"That sounds like a good plan. When HILL 7 is taken, I want your first two platoons to move forward immediately to give fire support until the heavy weapons and antitank guns can get up.

"Liaison Officer, can you continue fire support under this plan?"

ARTILLERY LIAISON OFFICER:—"Yes, sir. We are already firing on HILL 7, as planned. I will have the forward observer with Company L notify the fire-direction center when Company L is endangered by our fire. We can shift fire to HILL 8 or to any other targets which may appear suitable at that time."

VII

It has been shown that tanks lead an infantry-tank attack initially when the terrain is favorable for their employment and when their principal foes—the antitank gun, the antitank mine, and the antitank obstacle—are absent, or have been neutralized. Infantry leads the attack initially when any one of the above conditions does not obtain.

The word "initially" is important, because it will often happen that the conditions obtaining at the outset of an attack are materially changed a little farther along. When this will be the case, or when the commander has reason to believe, even if he does not know with certainty, that it will be the case, he will usually find it advantageous to employ both infantry and tanks in the leading wave.

There is nothing static about the formations used in any infantry-tank attack. The presence of both infantry and tanks well forward permits the commander to regroup and redispose his attacking echelon to meet changing conditions in the terrain or the defense.

As previously indicated, an attacking wave composed of infantry may be called upon to pass through a wave composed of tanks; similarly, an attacking wave of tanks may be called upon to pass through a wave composed of infantry. When a commander believes that such action is likely to be required frequently in a single attack, when the attack takes place under conditions of greatly restricted visibility, or when the attack is chiefly in the nature of a mopping-up operation, tanks and infantry attack together, rather than in separate waves. When this plan is adopted, unity of command within the composite waves must be assured. It is best effected by attaching a fraction of a tank company to each rifle company in the attacking echelon. Positive communication also is required, and tank commanders will direct their tanks from open turrets as long as possible when operating so closely with foot troops.

With unity of command and communication assured, it remains for each commander to apply the fires of the infantry and tanks; to maneuver the personnel and equipment toward the objective; and, when within assaulting distance, to combine the shock action of the tanks and the bayonet in effecting its capture. Backing this action and coordinated with it at every stage are the field-artillery supporting fires. These supplement the other fires, with priority attention to those hostile targets which the infantry and tank fires can least effectively engage and which constitute the greatest threat to the success of the combined attack.

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CHAPTER 4

Defensive Employment of Tanks With Infantry

"Failure to make profitable use of tanks when available is inexcusable." (FM 17-36, par. 1 *i.*)

This statement applies equally to the commander charged with the defense of a position and to the commander of an attacking unit, although the doctrines governing the employment of tanks with infantry in the attack are better understood by most infantrymen than the principles of their employment with infantry in the defense.

Our commanders in the field today are seldom concerned with a static defense, established in order to hold a certain line. The defensive problem they face most frequently is that of holding a recently captured key point for a relatively short time prior to resuming the attack. This involves a hasty defense which the front-line commander must prepare in, at most, a few hours.

Since the infantry commander is responsible for accomplishing a defense mission, it follows that command of the units of other arms in his sector must be given to him. Tank elements are customarily attached to the infantry, while the artillery is usually placed in direct support.

The size of the tank unit employed in the defense depends on the terrain, the extent of the front held, and the enemy situation. The battalion is the normal tank combat unit, and a battalion of tanks, when available, is a force of desirable size for attachment to an infantry regiment in the defense. The tanks so attached may be employed as a unit where suitable terrain is available. Where the terrain is unsuitable, companies and even platoons of tanks may be attached

to infantry battalions or companies. In general, wide fronts and open terrain dictate the use of tanks in mass; narrow frontages and close terrain justify more dispersion.

GENERAL PRINCIPLES

Let us consider a so-called "normal" situation, in which an interior infantry regiment, with a standard tank battalion attached and a battalion of field artillery in direct support, is engaged in the hasty defense of a position.

The infantry commander, in accordance with our defensive doctrine, must:

1. Organize a battle position to be held at all costs.
2. Provide security for the battle position by establishing general and combat outposts.
3. Make a coordinated plan to bring down the fires of all weapons upon the enemy as soon as he is within effective range, excluding only those weapons on the main line of resistance which remain silent for the purpose of achieving subsequent surprise.
4. Make a coordinated plan to place the fires of all available weapons in a continuous curtain, the final protective line, just in front of the defense area, to prevent the enemy from penetrating the battle position.
5. Make a coordinated plan to place the fires of all available weapons upon any penetration of the defensive position, just prior to employment of the reserve in a counterattack to eject the enemy from the battle position.

The infantry commander's attached tanks may be assigned missions in performance of any of the above elements of the defense plan. The tank missions thus assigned will be of two general types: (1) in close fire support of the defense area and (2) in counterattacks.

CLOSE FIRE SUPPORT OF THE DEFENSE AREA

Tank missions in close fire support of the defense area will be either (1) from hull-defilade positions, to support the infantry by direct fire or (2) to reinforce the fires of the field artillery.

When the terrain prohibits the mass employment of tanks, the regimental commander may attach tank elements to smaller units. Normal distribution would be a company of medium tanks (and a proportionate number of light tanks and assault guns) to each front-line infantry bat-

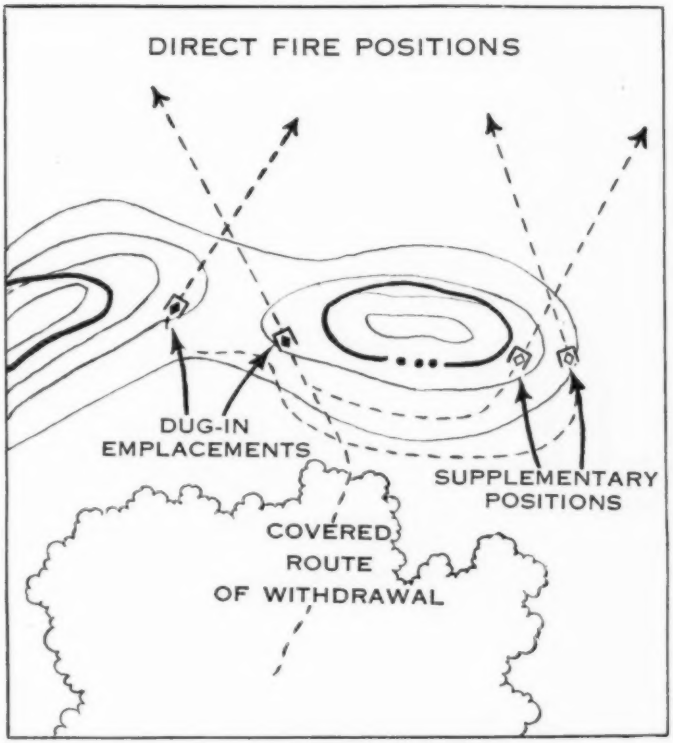

FIGURE 4.

talion. The battalion commander, in turn, must decide whether he will attach these tanks to the battalion reserve for counterattack or suballot them to front-line companies. Here, too, terrain and frontages are the guiding factors.

If the key terrain, whose retention is vital to the defender, is on or near the main line of resistance, the battalion commander may be justified in placing the tanks, by section (two tanks), in hull-defilade positions well forward, to deliver direct fire in support of the infantry. (See fig. 4.)

Initially the tanks are held in defilade, for protection against the enemy's artillery fire, but in readiness to occupy their firing positions. These positions should be located on the flanks of the platoon defense areas. Defiladed routes of withdrawal to the rear are essential. Each tank must have at least one alternate or supplementary firing position. If the enemy reaches a position from which he can launch an assault, the tanks may leave their firing positions and form up in a previously reconnoitered attack position, from which they can move rapidly in front of the defending infantry to crush the assaulting rifle units. Recent combat reports contain instances of the demoralization of an assaulting force when so surprised by enemy tanks. Such an attack is made by at least a platoon of tanks. A tank counterattack launched from direct-fire positions is extremely rare.

In general, the employment of tanks for direct fire close to the main line of resistance is exceptional, because it fails to take full advantage of the mobility and shock power of the tanks.

The volume of fire which can be delivered by tanks in reinforcement of the artillery is considerable. Within its range limitations, a medium tank platoon (five tanks) has fire power comparable to that of a light artillery battery. However, the number of suitable firing positions for the flat-trajectory tank gun is usually limited, as opposed to the relative ease of finding such positions for howitzers. One advantage of employing tanks in this manner is that they fire from positions from which they are readily massed to perform a counterattack mission.

If tanks are assigned both an artillery and a counterattack mission, sufficient ammunition must be provided at their firing positions so that, when committed in the

counterattack, they will still have their prescribed ammunition loads. If tanks are assigned both an artillery and an infantry direct-fire mission, the planning of the missions must take into account the time required to change from one mission to the other. This cannot be done on short notice.

COUNTERATTACKS

The primary mission of tanks in the defense is to counterattack, whether, in conjunction with other troops, to eject an enemy who has penetrated the battle position or, alone, to destroy an enemy who is forming for an attack.

This is our doctrine of counterattack, applicable to all arms:

1. Counterattack is the decisive element of defensive action.
2. A counterattack should be launched only when:
   a. Action is required because—
      (1) A vital terrain feature has been lost or is threatened.
      (2) A dangerous gap has been opened in the main line of resistance.
      (3) Fire alone has failed to eject the enemy from a penetrated area.
   b. Success of the counterattack is probable.
3. Successful counterattack is facilitated when:
   a. The enemy has been stopped or slowed.
   b. The enemy is disorganized.
   c. The enemy occupies an exposed position.
   d. The enemy can be surprised.
   e. Adequate reserves are available.
   f. Adequate supporting fires are available.

The presence of an enemy mechanized force in the area usually precludes a counterattack by infantry alone. If the enemy attacks with tanks first, followed by infantry, the tank counterattack must be delayed until it can be aimed at the destruction of the hostile infantry. The counterattacking unit must strike with all its force in a single blow. Little or no reserve is held out.

A tank counterattack may be made in front of the main line of resistance (see fig. 5) with the mission of disrupting an enemy force forming for an attack. The terrain, of course, must be suitable for tank action in the area of the

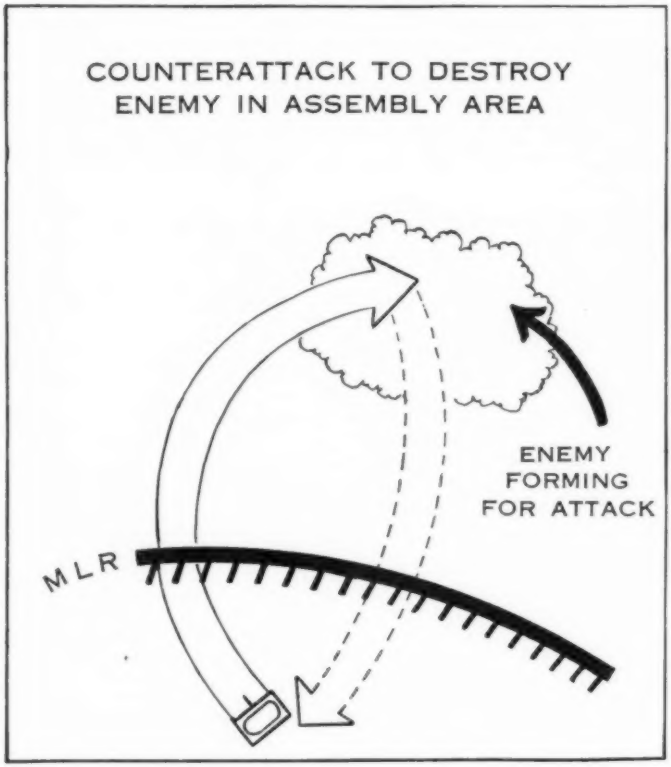

FIGURE 5.

counterattack. In addition, there must be assurance that no strong hostile forces of tanks or self-propelled antitank guns are present.

Tanks always make this type of counterattack alone, supported by fires of the infantry and artillery. The counterattack will not continue beyond range of that support. Its purpose is to gain time for the defense by disorganizing the enemy during his preparation for a coordinated attack.

A counterattack to eject an enemy who has penetrated the battle position utilizes the most valuable characteristics of tank forces—high mobility, armor-protected fire power, and shock power. Infantry ordinarily participates in this type of counterattack. The infantry commander has a coordinated fire plan prepared for it. He coordinates his counterattack plans in detail with the tank commander. If time permits, the counterattack is rehearsed by the counterattacking infantry element, over the area of most likely enemy penetration, in the presence of officers from the tank unit. Since this type of counterattack has the limited objective of restoring the main line of resistance, all routes from the assembly positions to the objective can be thoroughly reconnoitered by the tank commander. The executive officer of the defending infantry unit to which the tanks are attached normally commands the entire counterattacking force, including the attached tanks.

The first wave is usually composed of tanks, the second wave of infantry who will occupy the position. When the counterattack has driven out the penetrating forces, the enemy is pursued by fire only. Troops do not advance beyond the original limits of the position except on specific orders.

Figures 6, 7, 8, and 9 show a situation in which an interior infantry battalion defends an area on the main line of resistance, with its reserve company held mobile and a company of medium tanks attached. In Figure 6, the enemy has made a penetration and holds a position that threatens terrain vital to the battalion. Fire alone has failed to eject him, but the rear machine guns and the fires of adjacent units have slowed his advance. (Had the battalion commander decided that it had not been slowed sufficiently to

give the counterattack the probability of success, some elements of the tank company might have been assigned to stop the advance prior to the counterattack.)

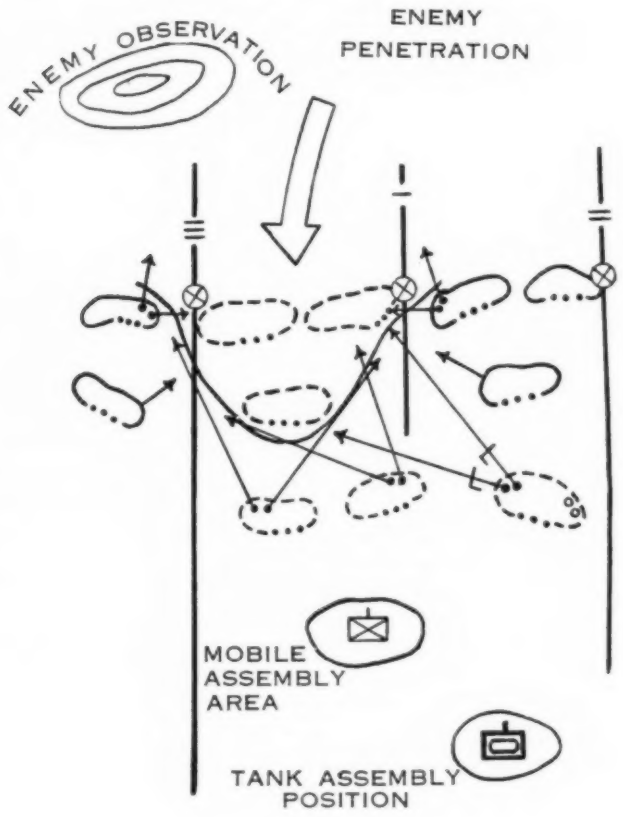

FIGURE 6.

Figure 7 shows the scheme of prearranged fires upon the area of penetration by all available weapons, while the infantry battalion reserve and the tanks move up to launch the counterattack.

Figure 8 shows the plan of maneuver for the counterattack. (If the tanks had been previously employed to reinforce the fires of the artillery, they would move directly from their firing positions to the attack position.) In order to achieve surprise in the counterattack, it is essential that both infantry and tanks leave their assembly areas by con-

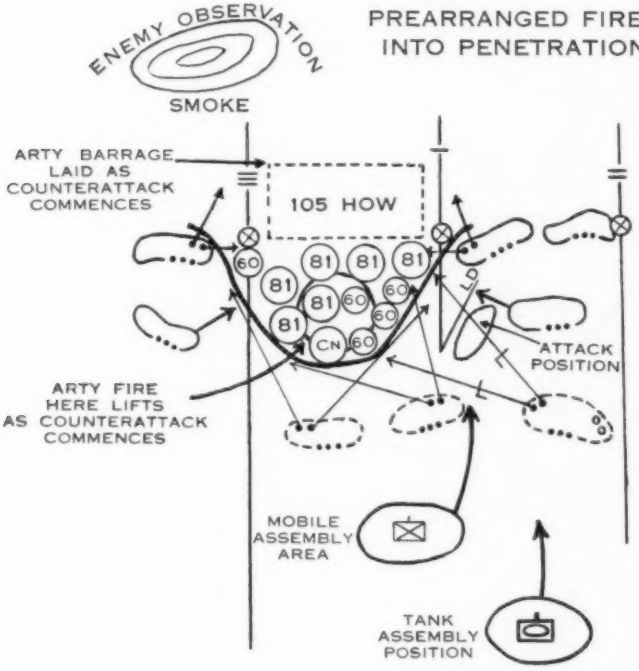

FIGURE 7.

cealed routes. The attack position of the tanks need not coincide with the line of departure of the infantry reserve, but it should be nearby. Note that the counterattacking tanks do not pass through the organized defense areas of the infantry but through the gaps between the defense areas. The counterattack should be launched before the

enemy has had time to organize effectively the area of penetration, and is directed against the shoulder of the enemy penetration, not against the nose of the penetrated area.

COUNTERATTACK
PLAN OF MANEUVER

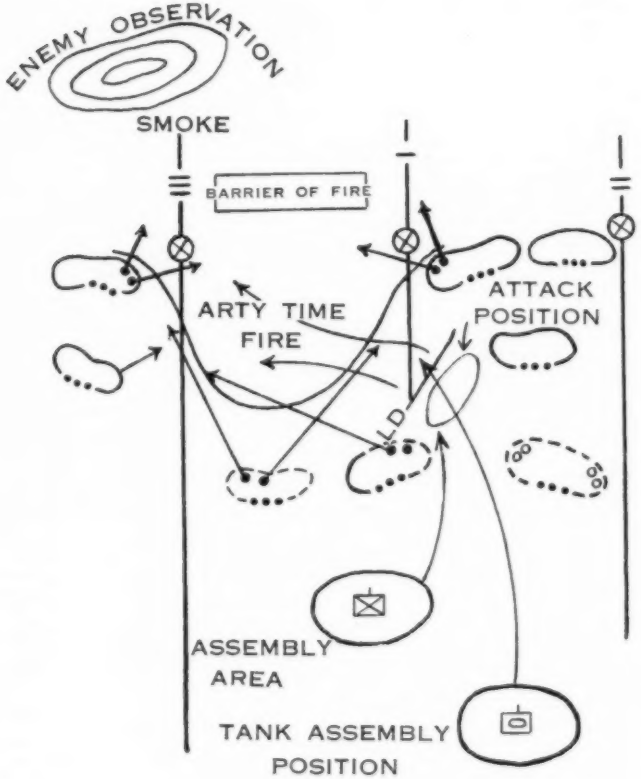

FIGURE 8.

Prearranged signals provide for the lifting and shifting of fires. As the counterattack leaves its line of departure, a barrier of fire is placed across the base of the penetration

to prevent reinforcement of the enemy in the area and to neutralize antitank guns which might otherwise disrupt the tank counterattack. Time fire is used, terrain permitting, for the latter purpose. Observation is denied the enemy by laying smoke where necessary, both before and during the counterattack.

The tank elements are assigned definite objectives, and capture them by fire and maneuver, neutralizing small-arms fire in order to make possible the advance of the infantry. If light tanks are available, they may be used to protect a flank of the counterattack or to follow the infantry and aid in mopping up isolated enemy groups.

Following a successful counterattack, the tanks remain in the vicinity of the restored main line of resistance until machine guns and antitank guns from rear areas have been moved forward and emplaced. During this period, the tanks have the responsibility of protecting against mechanized attack. When the infantry has reoccupied the original defense areas and the supporting weapons are in place, the tanks withdraw to their rallying point and thence to their assembly position (see fig. 9).

The same counterattack principles apply to larger units, for example, to an infantry regiment with a standard tank battalion attached. In this case, the heavy-weapons company of the reserve battalion, adjacent infantry, artillery, tanks, and any other available weapons aid in stopping the enemy penetration. While the counterattacking force is moving to the line of departure, the fires of the artillery, the cannon company, and attached assault guns are delivered upon the area of penetration. The tanks form the assault echelon; infantry forms the second wave. Some tank elements may accompany the infantry. The light tank company may be used as previously indicated.

DELAYING ACTIONS AND WITHDRAWALS

Outposts are established to screen the battle position, to deceive the enemy as to its location, and to slow his advance. Outposts perform one kind of delaying action. Figure 10

shows three possible schemes of employment for tanks in support of infantry in an outpost. Plan No. 1 involves either direct or indirect fire from hull-defilade positions. Plan No. 2 is a quick direct thrust from concealed positions against the advancing enemy. Plan No. 3 is a surprise flank attack across the route of the enemy advance. Plans 2 and 3 must be strongly supported by artillery and by the heavy-weapons company.

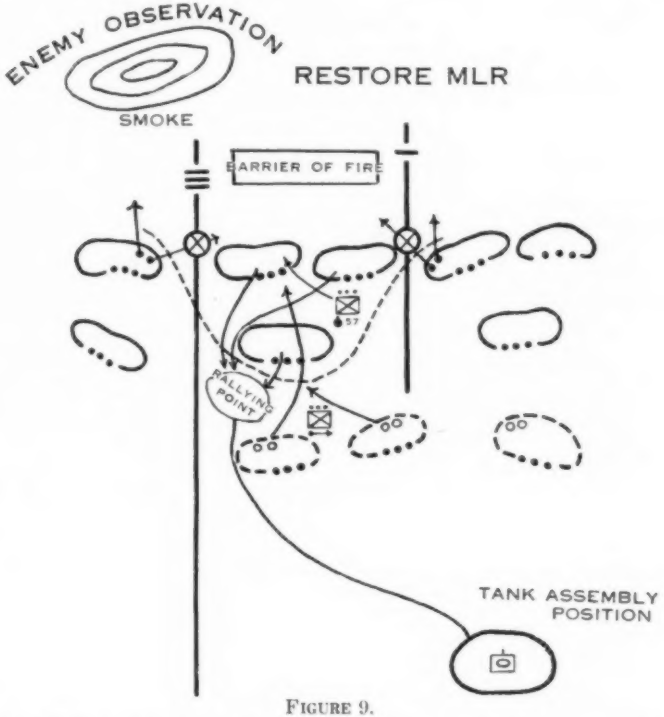

FIGURE 9.

In other types of delaying actions, tanks may support the delaying infantry force in the same manner as in an outpost mission. Offensive action by the tanks as in Plans 2 and 3 will usually effect the maximum delay of the enemy.

Tanks may also be used to cover a withdrawal. A day-

light withdrawal is contemplated only when to defer the action until dark would result in disaster to the command. When a daylight withdrawal is justified, tanks concealed in forward-assembly positions can make offensive sweeps and thrusts against an exposed enemy. Plans 2 and 3 of Figure 10 are, in general, applicable.

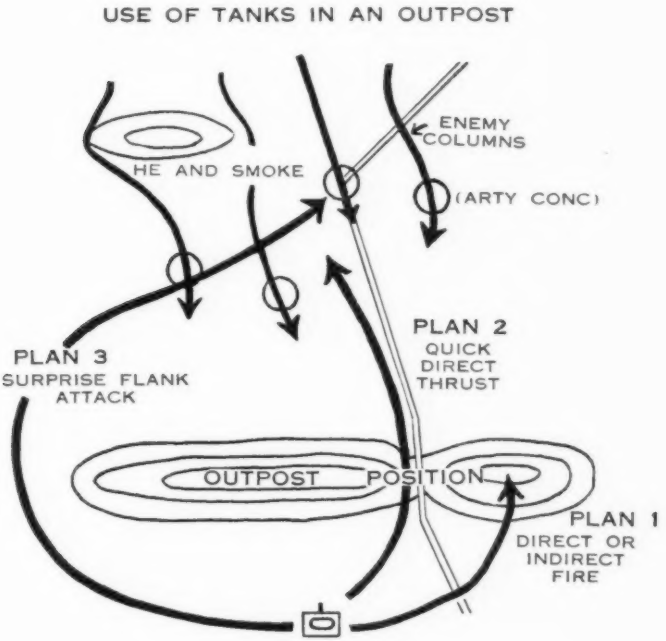

FIGURE 10.

In a night withdrawal, tanks may attack late in the afternoon, to confuse the enemy and disrupt his forward movement. The tanks then retire behind the general covering force, from which position they can (1) assist by fire the withdrawal of other troops and (2) be employed early the next day for counterattack. Rarely, if ever, will it be possible to employ tanks at night during the actual withdrawal.

All tank attacks for delaying purposes have strictly limited objectives, and must be strongly supported by artillery and all units present in the covering force.

SUMMARY

Joint defensive action by infantry, tanks, and artillery is governed by the following basic considerations:

1. The counterattack is the decisive element of defensive action.
2. Coordinated action by tanks greatly increases the probability of success in a counterattack by infantry.
3. Tanks are attached to infantry.
4. The primary mission of tanks is to counterattack in conjunction with the infantry and artillery.
5. Tanks lead infantry in a counterattack.
6. In delaying actions and withdrawals, tanks constitute a strong, mobile attacking force which can disrupt the hostile advance by bold, rapid thrusts forward or across the enemy's routes of approach.

CHAPTER 5

Time and Space: The Framework of a March Plan

Calculations and Use of Nomographs

A march is a movement of troops to a designated place conducted in such a manner that they arrive in time and in condition to perform their prescribed duty. In a combat zone, a march, like any other operation, may be interfered with by enemy action. Sometimes it is possible to anticipate such action and make plans accordingly. Often this is impossible. Incidents such as surprise road blocks or mine fields, unexpected destruction of bridges, or sudden aerial attacks on a marching column are ever-present hazards to the orderly accomplishment of a march.

These unpredictable hazards may spoil the best-planned march, but it is a painful fact that, even in the absence of such hazards, many marches turn into a confused series of races and halts because the plan could be executed only by Superman, with his cheerful disregard for the factors of time and space. March orders have been issued whose execution would have required two units to occupy the same stretch of road at the same time. Movements have been ordered which could not be executed because of cross traffic en route. Marches have been ordered executed with impossible speed, because foreseeable delays were left out of consideration. Proper determination of march data would have made it possible to avoid these accidents.

It is inexcusable to expose troops to the fatigue and possible hazards of a march without consideration and evaluation of all the limitations of time and space. The route must never present a surprise; the troops must know what

is required of them; the requirements must not exceed their capabilities; and the march must be completed within the specified time.

CALCULATION: A LAST RESORT

Given certain required data, it is possible to sit down with pencil and paper and calculate arithmetically all the distances, times, and rates pertaining to a march. It is obviously essential that an officer be able to do this. But the results will be purely theoretical. Whenever circumstances permit, all possible data should be obtained by ground reconnaissance and actual measurements.

For instance, the distance to be traveled in a march should be determined exactly by driving over the route. The same result *might* be obtained by measuring it on an accurate large-scale map. But, if the plan is not based on actual ground reconnaissance of the route, there is no assurance that the physical characteristics of the route may not cause deviation from the plan after the march has commenced.

Again, the road space of a marching unit can be calculated with reasonable accuracy in a command post, when the number of troops or motor vehicles and their formation are known. But the one positive way of determining road space is to put the unit on a road and measure the space it occupies, at its current strength, and in whatever formation is desired.

Similarly, the time required to complete a march can be calculated when the distance, rate, and road space are known. But the foolproof method is to clock an element at the specified rate over the selected route. Even though it may be impossible to follow this procedure over the entire route, it ought to be employed, for example, to find the time required to move a unit from the bivouac area to the initial point[1].

[1]Initial point: Point at which a march column is formed by the successive arrival and passage of the units that finally make up the column.

TIME DISTANCE AND TIME LENGTH

In determining the time required to complete any march, two factors must be considered. The first is the time required for the leading element of the column to move from the old area to the new. This time is known as the time distance. It is the time required by one man (or one vehicle) in the column to move from the initial point to the regulating point[2]. The second factor is the time required for the column to pass a given point (in this case, the regulating point) after the leading element has reached it. This time is known as the time length. The sum of the time distance and the time length is the time required to complete the march.

The time distance is dependent on the distance traveled and the rate of march[3]. It is determined by dividing the distance to be traveled by the rate of march.

For example, to determine the time distance of a march of 55 miles at a rate of 25 miles per hour: Divide 55 by 25. The result is 2.2 hours. To convert the decimal fraction to minutes, multiply it by 60. The result in this case is 12. The time distance, therefore, is 2 hours, 12 minutes.

The time length is dependent on the length of the column (the road space it occupies) and its speed. The road space, in turn, is dependent on the size of the unit and the formation employed.

Each planning agency within a unit should, when possible, determine on the ground, and tabulate for future reference, the road space of the unit and its component elements, at current strength and in various common formations. At the same time, it should clock the moving column at various speeds to determine its time length.

When this has not been done, the total road space (in yards) of a foot column may be computed with reasonable accuracy by multiplying the total number of men by:

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[2]Regulating point: Point at which an incoming column is broken up.

[3]Rate of march: Distance traveled per unit of time (ordinarily, per hour). Speed is distance traveled per hour of actual movement, halts excluded. If there are no halts, rate and speed are identical.

2.3 when in single file.
1.6 when in column of twos.
1.3 when in column of threes.
1.2 when in column of fours.

The above factors assume that, as standing operating procedure, a distance of 20 yards is maintained between platoons, 50 yards between companies, and 100 yards between battalions. Using this SOP, the total distances between units within a company amount to 80 yards; within a battalion, 540 yards; and within a regiment, 2,000 yards. A more accurate, but more laborious, calculation of road space can be made by finding the number of ranks, multiplying by 52 inches (the space occupied by each rank), and then, after converting the result from inches to yards, adding to it the total of the distances between units.

The time length is calculated by dividing road space by speed.

For example, to find the time length of a column whose road space is 1.5 miles and whose speed is 3 miles per hour: Divide 1.5 by 3. The result is .5 hours. Multiplied by 60, it becomes 30 minutes.

A simple method of determining time distance and time length is shown in Figure 11. The three logarithmic scales in a fixed positional relationship to one another are called a nomograph. Given a known value on any two of the scales, the corresponding value on the third scale is found by placing a straightedge so that it connects the two points representing the known values, and reading the third scale at the point where it is intersected by the straightedge.

Nomographs can be constructed to eliminate or simplify most calculation of march data. Figure 12, for example, is a nomograph expressing the relationship between cadence, rate or speed, and length of step in foot marching. Other nomographs are reproduced elsewhere in this chapter. A nomograph may be of any size, and, the larger the nomograph, the more accurately it may be read. The construction of a nomograph, however, is a technical process requiring considerable mathematical knowledge.

TIME LENGTH OF MOTOR COLUMNS

Motor march formations are of three types: close column, open column, and infiltration. Close column is a mass formation with vehicles at minimum safe-driving distance, usually prescribed as a distance (in yards) twice as great as the speedometer reading (in miles per hour). An open column is a more dispersed formation having a density of from 10 to 24 trucks per mile. Infiltration is a march in which trucks move singly or in small groups, usually with a density of about 5 trucks per mile.

A motor march unit[4] usually consists of from 15 to 25 trucks. The march units in a column are separated by time-gaps[5]. The time length of a motor column is therefore the sum of the time lengths of all the march units and of the time-gaps between units. In a movement by infiltration, the trucks are so dispersed that time-gaps are not prescribed between march units, but between serials only.

The number of time-gaps within a column is always one less than the number of its march units. The sum of all the time-gaps is therefore obtained by multiplying the number of march units, minus one, by the amount of each time-gap.

For example, to determine the sum of the time-gaps of a column organized in 8 march units with 2-minute time-gaps between units: Subtract 1 from 8. The result is 7. Multiply 7 by 2. The result is 14 minutes.

For a movement by infiltration, the sum of the time-gaps between serials is calculated by multiplying the number of serials, minus one, by the amount of each time-gap.

The time length of a close-column formation remains constant throughout any but extreme fluctuations in speed. This is because, as the speed is increased or decreased, each driver automatically readjusts the distance at which he follows the preceding vehicle so that the distance remains

[4]March unit: An element of a column, prescribed for the purpose of facilitating control, which moves or halts on the order or signal of its own commander. March units are usually grouped in serials, which are the major elements of a column.

[5]Time-gap: Time measured from the instant the last vehicle in one march unit clears a given point until the instant the first vehicle in the succeeding march unit reaches the same point.

Example (1)

REQUIREMENT: The time distance of a motor march of 15 miles at 10 miles per hour.

SOLUTION: Lay a straightedge from 10 on the D scale to 15 on the C scale. Where the straightedge intersects the A scale, read the answer—1 hour, 30 minutes.

Example (2)

REQUIREMENT: The road space of a column marching at a speed of 4 miles per hour and having a time length of 15 minutes.

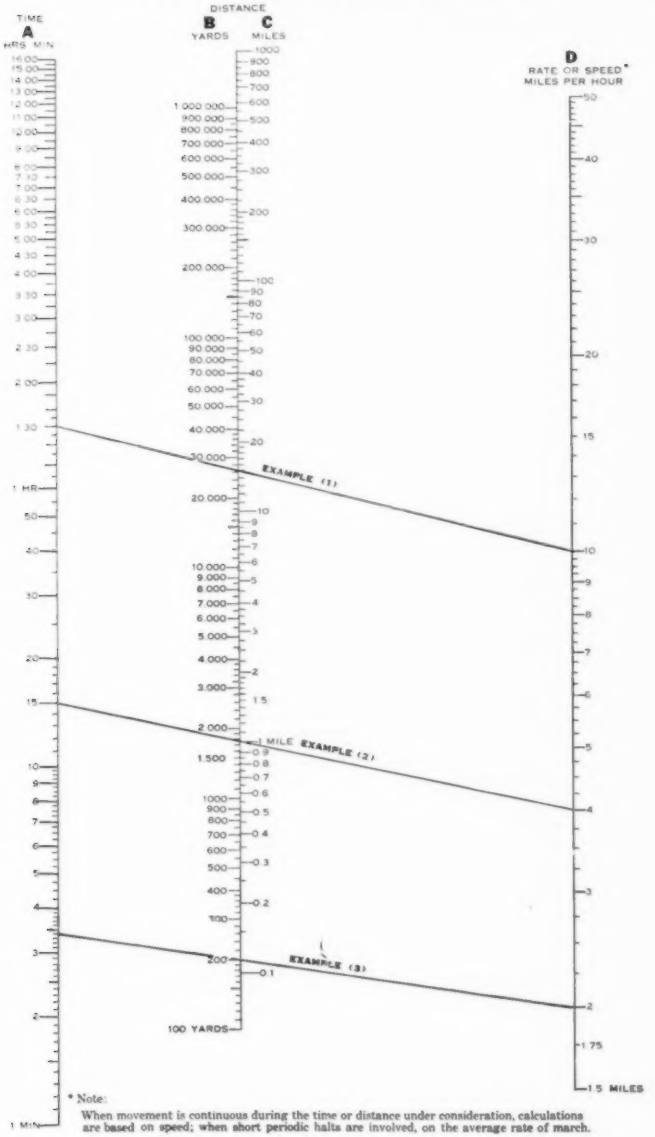
SOLUTION: Lay a straightedge from 15 (minutes) on the A scale to 4 on the D scale. Where the straightedge intersects the B scale, read the answer—1,760 yards—or, on the C scale, 1 mile.

Example (3)

REQUIREMENT: The time length of a column marching at a speed of 2 miles per hour and having a road space of 200 yards.

SOLUTION: Lay a straightedge from 2 on the D scale to 200 on the B scale. Where the straightedge intersects the A scale, read the answer—3.4 minutes.

TIME, DISTANCE, AND RATE NOMOGRAPH



* Note:
When movement is continuous during the time or distance under consideration, calculations are based on speed; when short periodic halts are involved, on the average rate of march.

FIGURE 11.

Example (1)

REQUIREMENT: The speed and rate[6] of march of a unit marching with a 35-inch step at a cadence of 130 steps per minute.

SOLUTION: Lay a straightedge from 130 on the A scale to 35 on the E scale. Where the straightedge intersects the B, C, and D scales, read the answers—3.58 miles per hour (rate) and 4.3 miles per hour, or 126 yards per minute (speed).

Example (2)

REQUIREMENT: The cadence with which a pace setter, having a 33-inch step, must lead a column which is to march at the rate of 3 miles per hour.

SOLUTION: Lay a straightedge from 33 on the E scale to 3 on the B scale. Where the straightedge intersects the A scale, read the answer—115 steps per minute.

[6]In constructing this nomograph, rate was assumed to be on the basis of 50 minutes' marching time per hour.

RATE STEP CADENCE NOMOGRAPH

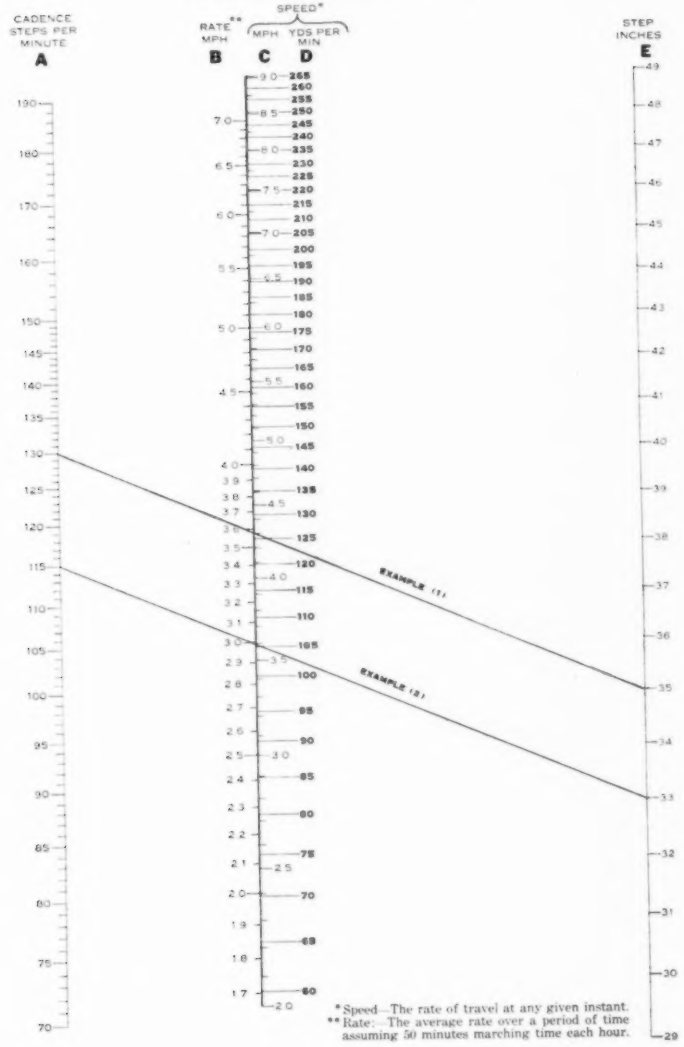


FIGURE 12.

twice as great, measured in yards, as his speedometer reading. Thus, if the speed of the column is increased, its road space is increased proportionately. If the speed of the column is decreased, so is its road space.

It has been determined experimentally that 100 trucks in close column pass a given point in approximately 8 minutes. Therefore the time length of any close-column formation is obtained by multiplying the number of trucks by .08 and adding the total of the time-gaps within the column.

For example, to determine the time length, in minutes, of a close-column formation of 225 trucks organized in 12 march units with 2-minute time-gaps between units: Multiply 225 by .08. The result is 18 minutes. Determine the sum of the time-gaps by the method previously described. The result is 22 minutes. Add 18 and 22. The result is 40 minutes.

The nomograph reproduced in Figure 13 is a simplified method of obtaining data for a motor march by close column.

The road space of a formation marching in open column or by infiltration may be calculated by either of two methods.

If the density of the column (within march units) is known, the road space of the march units is obtained by dividing the number of trucks by the density.

For example, to find the road space of the march units in a column of 150 trucks having a density (within march units) of 12 trucks per mile: Divide 150 by 12. The result is 12.5 miles.

If the order specifies a distance between trucks, rather than a density within march units, the road space is determined by multiplying the number of trucks by the distance prescribed between trucks (measured from center to center of trucks).

For example, to find the road space of an open column of 100 trucks with a distance of 150 yards between trucks: Multiply 100 by 150. The result is 15,000 yards or (divided by 1,760) 8.52 miles.

The road space found by either of the above methods is the road space of the march units themselves, without regard to additional distances resulting from the time-gaps between units, and is correctly used when it is desired to compute the time length of the march units prior to adding the sum of the time-gaps in order to find the time length of the entire column. In order to find the road space of the entire column, the total of the distances prescribed between march units must be added to the road space of the units.

Figure 14 is a nomograph expressing the relationship between the number of trucks, the road space, and the density of a march formation by open column or by infiltration. If the rate of march is 25 miles per hour, this nomograph may also be used to determine time length when the road space is known, or when both the number of trucks and the density are known.

It may occasionally be desired to compute the road space of a column when the time length and the speed are known. This is done by multiplying the time length by the speed.

For example, to find the road space of a column, with a time length of 72 minutes and traveling at a speed of 10 miles per hour: Divide 72 by 60 (to express the time length in hours instead of minutes. The result is 1.2 hours. Multiply 1.2 by 10. The result is 12 miles.

By a similar calculation, the distance between march units can be found when the time-gap and the speed are known.

For example, to find the distance between march units separated by a time-gap of 3 minutes and traveling at 25 miles per hour: Divide 3 by 60 (to express the time-gap in hours). The result is .05. Multiply .05 by 25. The result is 1.25 miles.

Both of the above calculations can be performed by use of the nomograph in Figure 11. The known time length (or time-gap, as the case may be) is applied on scale A ("time"), and the answer (road space) is read on either scale B or scale C ("distance").

Example

REQUIREMENT: The time length and road space of a close-column formation of 150 trucks organized in 9 march units, with 2-minute time-gaps between march units, and traveling at 25 miles per hour.

SOLUTION: Find 150 on the A scale and, at the same point on the B scale, read the time length of the march units—12 minutes.

Determine the total of the time-gaps by the method previously described: 9 minus 1, multiplied by 2—16 minutes.

Add 12 and 16 to obtain the time length of the column—28 minutes.

Lay a straightedge from 28 on the B scale to 25 on the E scale. Where the straightedge intersects the C and D scales, read the road space of the column—11.67 miles, or 20,500 yards.

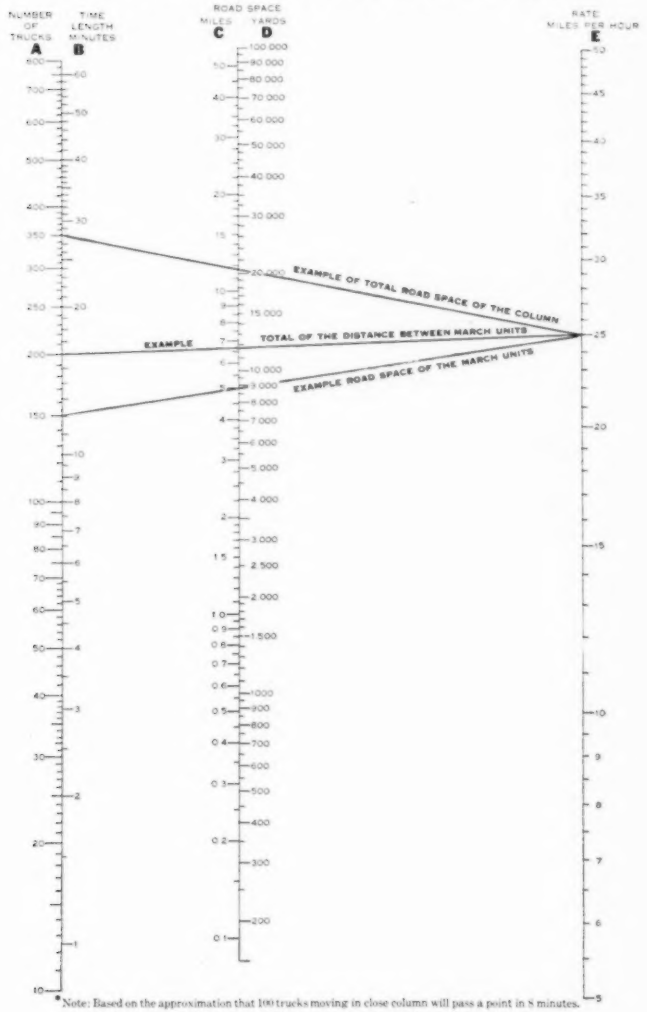
ALTERNATE SOLUTION FOR ROAD SPACE: Lay a straightedge from 150 on the A scale to 25 on the E scale. Where the straightedge intersects the C and D scales, read the road space of the march units—5 miles, or 8,800 yards.

Lay a straightedge from 16 on the B scale to 25 on the E scale. Where the straightedge intersects the C and D scales, read the road space between march units—6.67 miles, or 11,700 yards.

Add 5 and 6.67 (or 8,800 and 11,700) to obtain the road space of the column—11.67 miles, or 20,500 yards.

TIME LENGTH, ROAD SPACE, AND RATE NOMOGRAPH
CLOSE COLUMN MOTOR FORMATION ONLY*

MOTOR COLUMN WITH TRUCKS AT MINIMUM SAFE DRIVING DISTANCES



*Note: Based on the approximation that 100 trucks moving in close column will pass a point in 8 minutes. Towed loads are considered a part of the prime mover and are omitted in making calculations.

FIGURE 13.

Example

REQUIREMENT: Road space and the time length of a column of 120 vehicles, organized in 6 march units with 2-minute time-gaps, moving at 25 miles per hour, and maintaining distances of 150 yards between vehicles.

SOLUTION: Lay a straightedge from 120 on the A scale to 150 on the E scale. Where the straightedge intersects the C scale, read the road space of the march units—10.2 miles.

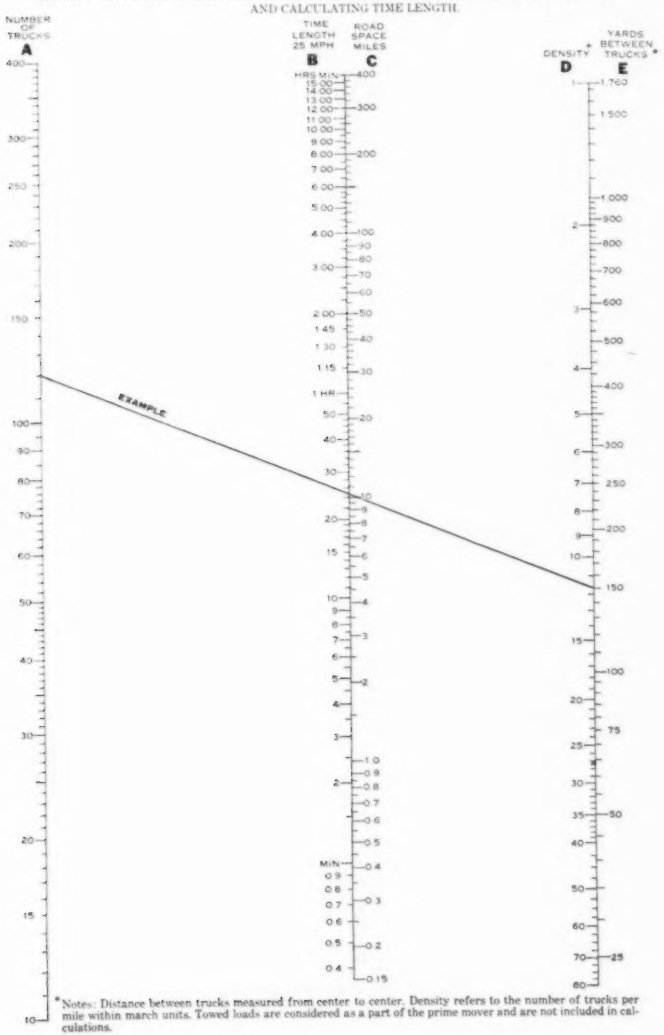
Using the nomograph in Figure 11, find the total of the distances between march units, resulting from the five 2-minute time-gaps—4.16 miles.

Add 10.2 and 4.16, to obtain the road space of the column—14.36 miles.

Find 14.36 on the C scale and, opposite it on the B scale, read the time length of the column—34.6 minutes.

NOTE: The B scale in this nomograph represents time length when the speed of the column is 25 miles per hour only. If another speed is prescribed, it is necessary to use the nomograph in Figure 11 to find the time length of the column, using the given speed and the total road space as calculated above.

ROAD SPACE, DENSITY NOMOGRAPH
OPEN COLUMN OR INFILTRATION MOTOR FORMATIONS ONLY
DENSITY OR DISTANCE BETWEEN TRUCKS PRESCRIBED. FOR DETERMINING ROAD SPACE, AND CALCULATING TIME LENGTH.



*Notes: Distance between trucks measured from center to center. Density refers to the number of trucks per mile within march units. Towed loads are considered as a part of the prime mover and are not included in calculations.

FIGURE 14.

TWO-SHUTTLE MOVEMENT

When the transport available for a troop movement is insufficient to move all the troops simultaneously, but is sufficient to move them in two shuttles, the first question to be determined in planning the march is whether the movement can be completed within the allotted time by truck alone. That is, can the trucks return to the initial point to reload for the second shuttle, or will it be necessary for the remaining troops to march part of the distance on foot and meet the returning trucks at an intermediate point?

To answer this question, refer to sections 1*a* and 2 of the check list on pages 80 and 81. Fill in the items as indicated. Now, if the hour entered as item (23) is later than the hour by which the movement has been ordered completed, it is not possible to make the movement by motor alone.

For example, let us take the case of an infantry regiment which is to march 50 miles, commencing at 0630. The movement is to be completed by 1430. Forty-eight nonorganic 2½-ton trucks are available, sufficient to transport the foot elements in 2 shuttles. Double banking of vehicles and foot elements at the initial point is prohibited. The motor elements will lead the march. March rates of 25 miles per hour for motor elements and 2.5 miles per hour for foot elements have been prescribed. The time length of the first shuttle has been found to be 1 hour, 15 minutes; of the second shuttle (nonorganic trucks only), 15 minutes.

To determine whether part of this movement must be made on foot, sections 1*a* and 2 of the check list are completed, as follows (item (11) is not required at this point):

1. *a.*	(1)	Mvmt starts at	06 30
	(2)	Mtrs delay start by	.....
	(3)	Time distance 1st shuttle	2:00
	(4)	Detrucking time	:10
	(5)	Turn-around time	:15
	(6)	Reassembly, reorganization	1:15
	(7)	Time distance returning	2:00
	(8)	Turn-around time	:15
	(9)	Additional delays	.....
	(10)	Total of above	12 25

2.	(18)	Item (10)	12 25
	(19)	Entrucking time	:15
	(20)	Time distance 2d shuttle	2:00
	(21)	Additional delays	
	(22)	Time length 2d shuttle	:15
	(23)	Total items (18)-(22)	14 55

It is now known that the troops cannot be moved entirely by truck, as this movement would not be completed until 1455, 25 minutes later than the march order directs. Therefore the troops in the second shuttle must march part of the distance on foot and meet the returning trucks at some intermediate point.

The next step is to find the minimum distance which these troops must march if the movement is to be completed on time. This is calculated by finding the difference between the required hour of completion and the hour of completion by motor transport alone, multiplying by the prescribed rate of march for vehicles, and dividing by 2.

In the present instance, the difference in times is, as noted above, 25 minutes or (divided by 60, for conversion into hours) .42 hours. This, multiplied by 25, becomes 10.5 and divided by 2, 5.25. The troops in the second shuttle must march at least 5.25 miles before entrucking.

The third step is to determine how far the troops must march on foot if the movement is to be completed in the least possible time. This may be determined from the nomograph in Figure 15, which has been constructed for use with two commonly prescribed sets of march rates for motor and foot elements. First, however, it is necessary to know items (11) and (17) of the check list (the totals of all delays, exclusive of marching time, for motor and foot elements, respectively), because scale D of the nomograph represents the value of item (11) minus item (17).

Check List of Time Factors
in a Two-Shuttle Movement

1. To determine the time at which the motor and the foot elements will reach the selected entrucking point[7] ready to commence the second shuttle.

   a. Motor elements.

   (1) Hour at which the movement commences.

   (2) Difference between starting hours of foot and motor elements, when the foot elements lead (estimated as the time length of the foot elements).

   (3) Time distance of the first shuttle, initial point to regulating point.

   (4) Detrucking time of the first shuttle (estimated average: for personnel, 10 minutes; for materiel, 20 minutes).

   (5) Turn-around time of the returning trucks (estimated average: 15 minutes).

   (6) Reassembly and reorganization time of the returning trucks (estimated as the time length of the first shuttle).

   (7) Time distance of the returning trucks, regulating point to selected entrucking point.

   (8) Turn-around time of the returning trucks at the selected entrucking point (estimated average: 15 minutes).

   (9) Any other delays prior to entrucking the second shuttle.

   (10) Sum of items (1) through (9): hour at which the trucks are ready to load troops for the second shuttle.

   (11) Sum of items (2), (4), (5), (6), (8), and (9): total of all delays exclusive of marching time.

b. Foot elements.

(12) Hour at which the movement commences (item (1)).

(13) Differences between starting hours of motor and foot elements, when the motor elements lead (estimated as the time length of the motor elements).

(14) Time distance of the foot elements, initial point to selected entrucking point.

(15) Any other delays prior to entrucking for the second shuttle.

(16) Sum of items (12) through (15) : hour at which the foot elements are ready to entruck for the second shuttle.

(17) Sum of items (13) and (15) : total of all delays exclusive of marching time.

2. To determine the time at which the second shuttle (and therefore the movement) will be completed.

(18) Item (10) or item (16) — whichever hour is later.

(19) Entrucking time of the second shuttle (estimated average: for personnel, 15 minutes; for materiel, 20 minutes).

(20) Time distance of the second shuttle, selected entrucking point to regulating point.

(21) Any other delays between entrucking of second shuttle and arrival at the regulating point.

(22) Time length of the second shuttle.

(23) Sum of items (18) through (22) : hour at which the movement is completed.

[7] If the entire movement is by truck, the selected entrucking point will be the same as the original entrucking point, in the area where the movement starts, and section 1*b* of the check list is not applicable. If, however, the troops in the second shuttle march on foot for part of the distance, the selected entrucking point will be an intermediate point, affording a good turn-around, somewhere between the initial point and the regulating point.

The appropriate sections of the check list appear as follows:

1. *a.*	(2)	Mtrs delay start by	.....
	(4)	Detrucking time	:10
	(5)	Turn-around time	:15
	(6)	Reassembly, reorganization	1:15
	(8)	Turn-around time	:15
	(9)	Additional delays	.....
	(11)	Total of above	1:55
b.	(13)	Foot trs delay start by	1:15
	(15)	Additional delays	.....
	(17)	Total items (13)-(15)	1:15

Item (11) minus item (17) is 40 minutes. When a straightedge is placed to connect 50 on the A scale and 40 (minutes) on the D scale of the nomograph, it intersects the C scale at a reading of 10.7 miles.

It is now known that, if the troops of the second shuttle march 10.7 miles on foot before entrucking, the movement will be completed in the shortest possible time. It is known that the selected entrucking point must be at least 5.25 miles, and preferably not more than 10.7 miles, from the initial point. There remain only the actual selection of the entrucking point and the final calculation of the length of time required to complete the march, using that point. But the entrucking point cannot be selected arbitrarily. All the time and effort devoted to planning the march may be wasted if an entrucking point, picked by guesswork on a map, proves to be unsuitable when the trucks reach it. If the turn-around requires 45 minutes, when only 15 were allowed in the schedule, the rest of the schedule is worthless. Therefore, ground reconnaissance is essential, first, to select a point at which the turn-around can be made and second, to permit accurate determination of the time the turn-around will require.

Assume that the selected point is 9 miles from the initial point. Now, after correction of those items which are affected by the location of the entrucking point, the check list appears as follows (items (11) and (17) are no longer required):

TWO SHUTTLE NOMOGRAPH

FOR DETERMINING THE DISTANCE THE FOOT ELEMENTS MUST MARCH ON FOOT IN ORDER TO COMPLETE THE MOVEMENT IN THE LEAST TIME

When sufficient transportation is available to move the unit in two shuttles and foot elements, to be moved on the second shuttle, march on foot until picked up by motors of the second shuttle.

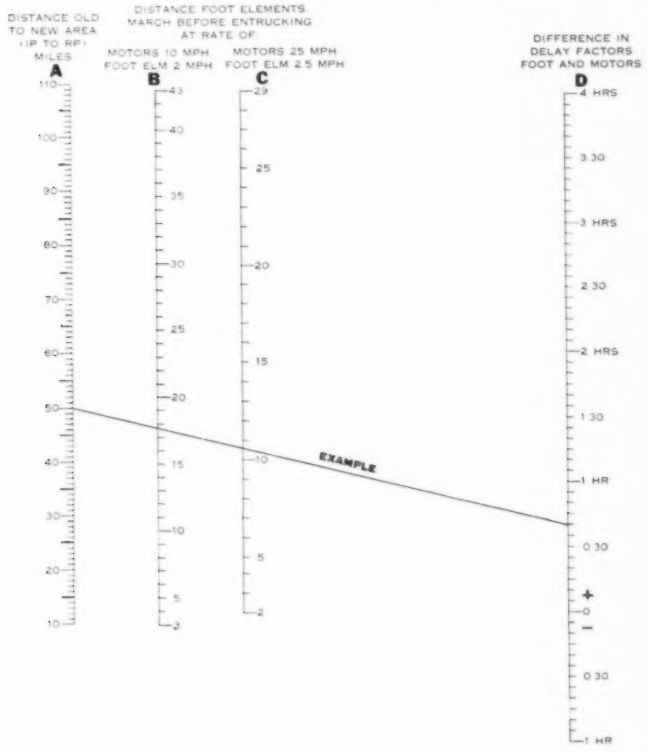


FIGURE 15.

1. *a.*	(1)	Mvmt starts at	06 30
	(2)	Mtrs delay start by	.....
	(3)	Time distance 1st shuttle	2:00
	(4)	Detrucking time	:10
	(5)	Turn-around time	:15
	(6)	Reassembly, reorganization	1:15
	(7)	Time distance returning	1:39
	(8)	Turn-around time	:15
	(9)	Additional delays	.....
	(10)	Total of above	12 04
b.	(12)	Mvmt starts at	06 30
	(13)	Foot trs delay start by	1:15
	(14)	Time distance foot trs	3:36
	(15)	Additional delays	.....
	(16)	Total items (12)-(15)	11 21
2.	(18)	Later of items (10) & (16)	12 04
	(19)	Entrucking time	:15
	(20)	Time distance 2d shuttle	1:39
	(21)	Additional delays	.....
	(22)	Time length 2d shuttle	:15
	(23)	Total items (18)-(22)	14 13

Using the selected entrucking point, 9 miles distant from the initial point, the march will be completed at 1413 — item (23) — with 17 minutes to spare.

ACCORDION ACTION OF A COLUMN

The predicament of a driver near the tail of an open-column motor formation when the column is forced to slow down to pass an obstruction or to negotiate a sharp curve is a sad one. Supose that the column is 2 miles long. Its prescribed speed is 25 miles per hour, and drivers have been ordered to maintain 100 yards between trucks. The head of the column slows down to 5 miles per hour at the obstruction, then immediately resumes normal speed. When the head of the column slows, all vehicles in the column also slow equally, in order to maintain the prescribed distances. At 5 miles per hour, the last vehicle in the column reaches the obstruction 24 minutes after the first vehicle. But, in the meantime, the first vehicle has been traveling at 25 miles per hour for 24 minutes and is now spinning

along 10 miles beyond the obstruction, with the following trucks trying desperately to regain their proper positions. If the drivers at the end of the column now choose to continue at the prescribed speed of 25 miles per hour, they will finish the march as stragglers. If they increase their speed in order to regain their proper positions, they risk disciplinary action for infringement of traffic regulations. The last truck in the column, if it increases speed to 35 miles per hour, will require 48 minutes to regain its normal position.

Exactly the same principles affect a foot column. Consider a column of troops moving at 3 miles per hour and occupying 1 mile of road space. In order to by-pass a bomb crater, the head of the column slows to 1 mile per hour. To maintain the prescribed distances, the entire column slows equally. Now, the leading element, having passed the crater, again commences to march at 3 miles per hour. Before reaching the crater, the last element has to march 1 mile at a speed of 1 mile per hour. It will therefore pass the crater 1 hour behind the leading element. But during that hour the leading element will have marched 3 miles. The column now has a road space of 3 miles instead of 1, and the unfortunate troops in the rear must double-time at 5 miles per hour for the next hour in order to resume the prescribed formation.

The important thing to note is that the effect on the rear element is exactly the same whether the slow speed is maintained by the forward element for 1 minute or 1 hour. Suppose that the foot column, instead of by-passing a crater, is forced to march at 1 mile per hour for 30 minutes while passing through a ½-mile defile. When the leading element emerges from the defile and resumes the 3-mile-an-hour speed, the rear element also has marched ½ mile and is still ½ mile away from the defile. Since the defile is ½ mile long, the rear element has 1 mile farther to march at the reduced speed. This, again, will require 1 hour, during which time the leading element will have marched 3 miles past the

defile. The situation is exactly as though the leading element had been slowed only momentarily, instead of for 30 minutes.

Thus, the length of time required to negotiate an obstacle has no effect on the road space of the column on the far side of the obstacle. The factors which do extend that road space are the length of the column and the difference between the speeds of the head and tail of the column. The longer the column and the more the speed of the head exceeds that of the tail, the greater will be the extension of the column by the time the last element clears the obstacle.

There are two ways in which to avoid this disruptive effect of accordion action.

The first is to require the leading element, whenever it is forced by an accident of terrain to reduce speed, to maintain the slow rate until the tail of the column has passed the obstacle. This solution has the disadvantage of adding excessively to the marching time. In the example cited above of a foot column passing through a defile, the leading element, by resuming normal speed immediately after leaving the defile, lost only 20 minutes, because it required 30 minutes to travel a distance which would normally require 10. If the leading element had been forced to march at 1 mile per hour until the last element had emerged from the defile, the delay would have totaled an hour, because the leading element would have traveled only 1½ miles in a time in which it should march 4½. In the example in which the foot column by-passed a bomb crater, the leading element suffered only a trifling delay. But, if it had waited for the tail of the column to pass the crater before resuming the speed of 3 miles per hour, it would have suffered a delay of 40 minutes.

The method which avoids both the undesirable effect of accordion action and unnecessary loss of time is to require the entire column to reduce the distances between units (platoons, companies, etc., or march units, in a motor march), instead of reducing speed, when the leading element slows down. This has the effect of reducing the road

space of the column on the near side of the obstacle and increasing it on the far side until it has returned to normal. All elements in the column march identical distances at identical speeds, although not simultaneously, and the time length of the column remains constant.

In order to accomplish this, careful attention must be given to the distances which are prescribed for normal marching. Since, in a road march on foot, the speed will rarely be reduced by accidents of terrain to less than one half of normal, it is sufficient to prescribe distances between subordinate units such that, when the column is closed, its road space is cut in half. In other words, of the total road space of the column, one half is actually occupied by those units; the other half is accounted for by the distances between units. All can then maintain the prescribed speed except when actually negotiating obstacles. The distances between units are permitted to vary as may be necessary to compensate for differences in speed within the column. Communication by radio, motor messenger, or visual signal between the head and the tail of the column is desirable so that, if overextension of the column still occurs, the column may be closed to normal by slowing the leading elements rather than by speeding up elements in the rear.

Reference was made earlier to a standing operating procedure prescribing distances of 20 yards between platoons, 50 yards between companies, and 100 yards between battalions marching on foot. These distances are in most cases sufficient to permit the head of the column to reduce speed by 50 percent (or more) without requiring the following units to slow down before the road space of the column has been reduced proportionately. When the above distances between units are maintained, the approximate reduction in speed which can be made by the leading element without producing an unfavorable accordion action is as follows:

Reduction in speed permitted by distances between units in single file	35 percent
Reduction in speed permitted by distances between units in column of twos	50 percent

Reduction in speed permitted by distances between units in column of threes ..... 60 percent
Reduction in speed permitted by distances between units in column of fours..... 70 percent

Motor vehicles in close column in which distances are governed by a "speedometer multiplier" are not, within a reasonable range of speeds, subject to the undesirable effects of accordion action, even within march units, for the reason that the speedometer multiplier automatically puts into effect the solution recommended above. Each driver is required to maintain his distance from the next preceding vehicle in a fixed ratio to his speed. If the column slows, he reduces the distance, and the road space of the column is reduced. If the column accelerates, he increases the distance, and the road space of the column is extended.

However, in a motor column in which the speedometer multiplier does not govern distances, a somewhat different solution must be adopted. The best practice is to prescribe both an average distance between vehicles and a minimum distance to which they may close when necessary. The time-gaps prescribed between march units are of such size that, at the slowest speed which may be expected at any point in the march, they will provide an adequate "cushion" for the march units which follow them. If the time-gaps are correctly calculated, no march unit will have to reduce speed except when actually negotiating an obstacle.

To determine the necessary size of the time-gaps, first calculate the time length of one march unit moving at normal speed and with normal distance between vehicles. Then calculate the time length of one march unit moving at the slowest speed anticipated during the march and with the minimum allowable distance between vehicles. Now subtract the first (normal) time length from the second. The difference between the two is the minimum time-gap required to provide an adequate cushion. In practice, it is desirable to prescribe time-gaps slightly greater than necessary, in order to provide a safety factor. Such time-gaps, properly determined, will merely require the last trucks of

the march units, on clearing an obstruction, to travel at slightly more than the prescribed speed in order to resume formation.

For example, to find the proper time-gaps between march units of a column traveling at 25 miles per hour, organized in march units of 20 vehicles each, with an average distance of 150 yards between vehicles and a minimum allowable distance of 50 yards, when the slowest speed expected during the march is 5 miles per hour:

Multiply 150 by 20. The result is 3,000 yards or (divided by 1,760) 1.7 miles — the normal road space of one march unit. Divide 1.7 by 25. The result is .068 hours or (multiplied by 60) 4.1 minutes — the time length of one march unit at normal speed and with normal distances between vehicles.

Multiply 50 by 20. The result is 1,000 yards or (divided by 1,760) .57 miles — the road space of one march unit with the minimum allowable distance between vehicles. Divide .57 by 5. The result is 1.14 hours or (multiplied by 60) 6.8 minutes — the time length of one march unit at minimum speed and with minimum allowable distances between vehicles.

Subtract 4.1 from 6.8. The result is 2.7 minutes — the minimum time-gap required. In this instance, a time-gap of 3 minutes should be prescribed.

Time-gaps, properly prescribed, serve purposes other than facilitating control and cushioning the effect of changing speeds within a column, and should be prescribed in all motor marches, whether by close column or otherwise. They provide a small time cushion for delays in arrival of elements at the initial point. By separating the march units, they reduce the possibility of intermingling of units and make identification easier. They permit movement of some cross traffic. They facilitate the extension of the column, as, for instance, in adopting a more dispersed formation at daylight. Finally, they relieve congestion at the regulating point, facilitating expeditious dispersal of serials and march units to their respective destinations.

Keep in mind the three basic principles of march planning:

1. *Ground reconnaissance.* Whenever the tactical situation permits, make a road reconnaissance. It is the surest method of obtaining accurate time and space data for planning a march.

2. *Predetermined data.* Never estimate time and space factors of a column when it is possible to measure them. Keep an up-to-date tabulation of the time and space factors of your unit ready for reference.

3. *Accurate calculation.* When calculation of data is necessary, perform it carefully and have confidence in your figures. They will be infinitely more reliable than guesswork. The methods which have been described here facilitate both accuracy and speed in calculation.

Time and space factors constitute the necessary framework on which a good march plan is built. No matter how well the plan is rounded out or how expertly the movement is executed, it cannot be successful if this framework is unsound. A full understanding of the foregoing principles governing time and space factors in troop movement is the first and necessary basic step toward the orderly and timely completion of a march.

CHAPTER 6

Combat Map Reading

No infantry officer goes overseas without having had instruction in map and aerial-photograph reading, yet deficiencies in this basic military qualification have frequently been reported among officers in combat. In some way, the instruction which these officers received was inadequate.

The opinions of senior officers who have observed such deficiencies may be summarized as follows:

Even the officers who exhibit the deficiencies possess a good knowledge of the mechanics of map and aerial-photograph reading. They are able to utilize this knowledge successfully as long as their efforts are confined to paper work. Their principal failing is inability to reconcile maps and aerial photographs with the actual ground represented, as a direct result of the fact that while their training covered the mechanics of the subject, practical application of such training was neglected.

All of this might be summed up in a single statement: We have trained a lot of good map *readers* but not enough good map *users*.

The map-reading courses at our service schools stress the mechanics of the subject, which must, of course, be thoroughly mastered. They are the tools which are essential to successful map reading in the field. Any reduction in allotment of the time necessary for thorough grounding in the mechanics of map and aerial-photograph reading would seriously handicap the map user.

The field work which follows the theoretical instruction is excellent as far as it goes. But it is not rigorous enough. Not only at service schools, but everywhere that map and aerial-photograph reading are taught, the field work

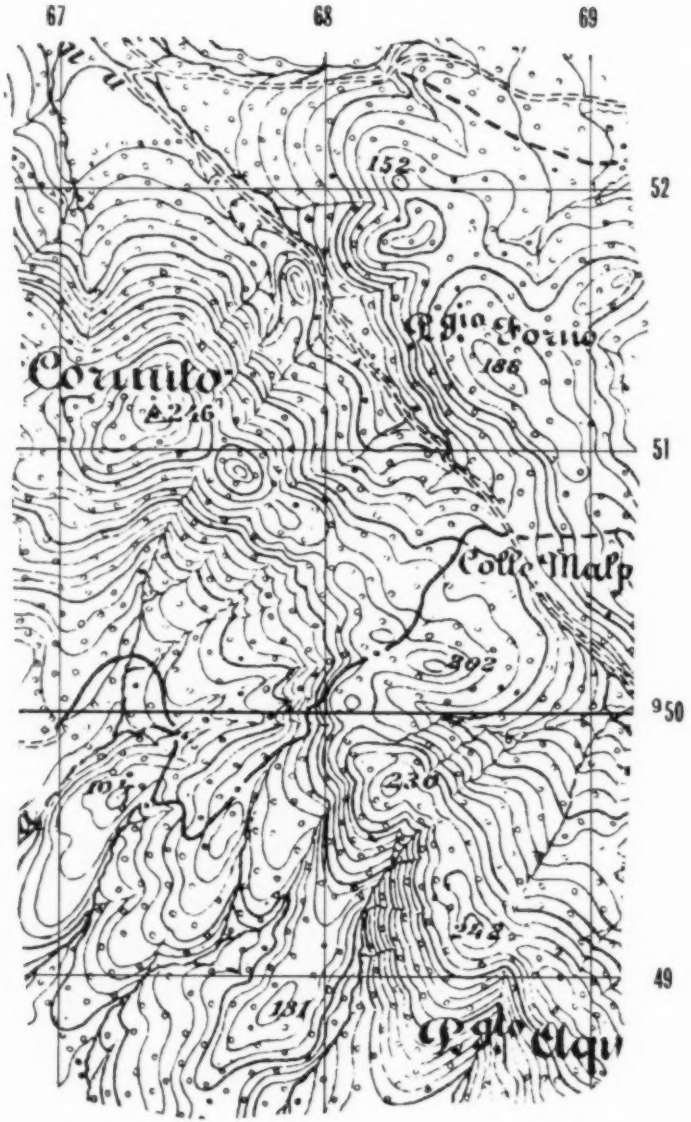


FIGURE 16.—Section of map as issued during Italian campaign.

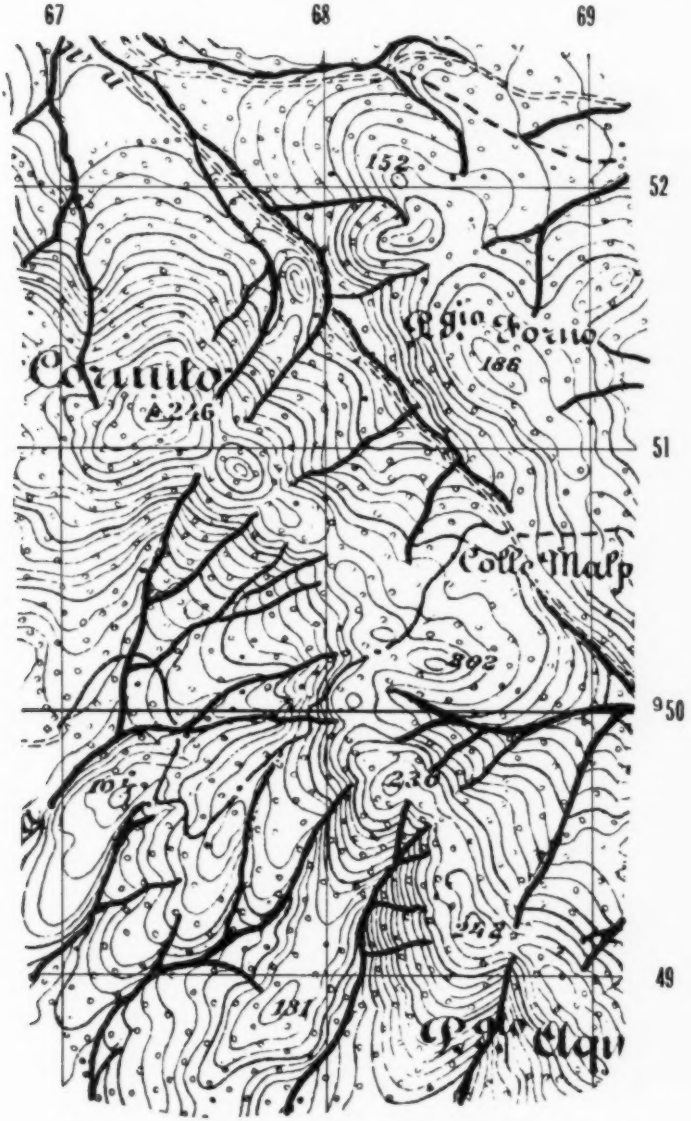


FIGURE 17.—Same map section shown in Figure 11, after accentuation of stream lines.

should take the students into completely unfamiliar terrain to solve their practical problems. Only in this way can the student learn to apply his theoretical knowledge in such a manner that he will be ready to take full advantage of his training when men's lives and success in battle are at stake.

In addition, every course of instruction should allot time for the study of battlefield expedients and for additional emphasis on certain aspects of the subject which have proved to be especially important in combat. Very often, the difference between a good map reader and a good map user lies in a working familiarity with such expedients and procedures.

It is with some of these combat lessons in map reading that the present discussion deals.

II

In Italy, most of the maps issued to our troops were on a scale of 1:50,000. On infrequent occasions, the scale was 1:25,000. Sector maps on a scale of 1:100,000 were always issued, and sometimes these were the only maps available. Drivers received the Italy Road Map, scale 1:200,000, which was adequate for their needs. Normally, there were enough maps of any area available for initial issue to all using personnel, but resupply was uncertain.

Figure 16 shows a small section of a typical map used in the Italian campaign. The scale is 1:25,000; the map is in one color only, as were many maps used during the campaign. The confusion of detail, increased by the fact that only a single color is employed, is immediately noticeable in this map. Stream lines, for example, might easily be confused by the reader with roads, trails, or even contours.

To eliminate some of this confusion, the first thing that was done when new maps were received at headquarters of a using organization was to accentuate heavily all stream lines. Figure 17 shows the same map after the stream lines have been accentuated. Accentuation in blue, rather than black, was considered desirable. Ridge lines were not added to maps, because they are easily visualized when

the stream lines are clear, and because additional lines would further obscure positions on the map. Roads, however, were usually given additional prominence by tracing main highways in red and secondary routes in green.

Except on operations maps in headquarters, military positions were not shown on any maps. There were two reasons for this.

The first was security—maps may be lost in front-line units, or their possessors may be captured.

The second reason was the difficulty of resupply. As the military situation changed and units moved, maps (which could not be replaced) would rapidly become obscured by erasures and mark-overs if it were attempted to keep the military information on them up to date. This would eventually render them valueless for identification of ground features—their primary purpose.

Since military positions were not shown, it may be asked how the maps were of assistance in identifying units and showing fields of fire. The answer is simply that this required constant practice by all the personnel concerned. Each map user habitually referred to his map whenever he visited an unfamiliar piece of terrain, located a unit, or arranged supporting weapons. In this way his firsthand knowledge supplemented the information on the map.

More important, all leaders were taught to "blow up" a small section of an issue map into a sketch of much larger scale and to show accurately on the sketch their unit positions, plus significant detail of the terrain in the unit's area. Sketches of subordinate units were assembled by each larger unit, and a composite sketch made from them.

This chain of combined sketches extended from platoons through companies and battalions to the regiment. Each such detailed sketch was normally accompanied by an overlay showing only the major features of the position. Thus the sketches served a dual purpose in presenting a picture of the situation which the small scale of the maps issued would not permit, while at the same time conserving the supply of maps.

Figures 18 and 19 show how these sketches were prepared Figure 18 is a section of a 1:50,000 map. In Figure 19, a front-line rifle company, located within the central grid square of the area shown in Figure 18, has sketched, on a larger scale, the details of its position. Sketches of platoon areas, submitted to the company, were referred to in preparing the company sketch, which, in turn, will be handed on up to battalion.

These sketches, as employed by most units in Italy, actually presented a detailed study of the situation plotted on the battalion operations map. Platoon and company sketches normally included the following: command posts; squad locations; organic crew-served weapons, plus any supporting weapons located within the unit's area; mines or wire, if present; and important terrain features, such as houses, woods, prominent elevations and depressions, particularly those which for any reason did not appear (or appeared inaccurately) on the maps issued.

III

Personnel who for the first time are using maps in unfamiliar country are prone to accept all information alleged on their maps as correct beyond question. Every map user must constantly bear in mind that a map is merely a representation of some person's idea of the ground at some past time. Map makers fall into error, and the features on the ground are subject to change.

In judging the reliability of a map, its source is an important consideration. Maps made from aerial photographs are less accurate than those compiled by survey. Automobile road maps and maps issued by many commercial concerns are, in general, less accurate than those compiled by official military or civil agencies.

Age is the other chief consideration in weighing the probable accuracy of a map. Woods can be cut down. In some climates, vegetation grows with great rapidity. Towns are enlarged, or dwindle in size, as economic conditions dictate. Names of localities are often changed. Towns, rivers and roads often have several names, and all of the

names may appear on various maps. Roads are resurfaced or relocated or even abandoned altogether. In Sicily, an American battalion cut 15 miles of road, with great effort, across a rugged countryside, to reach a main highway by which, according to the maps, the route to an important objective would be greatly shortened. The battalion never made its junction with this fine highway, because the highway had not existed since the time of the Caesars. The map makers had merely continued, either in ignorance or as a gesture of historical courtesy, to show the road as it once existed.

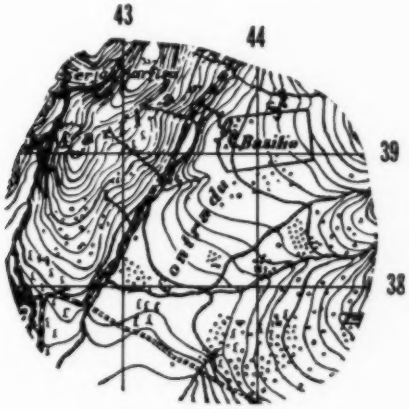


FIGURE 18.—Section of 1:50,000 map including company area shown in blown-up sketch in Figure 19.

In the Italian campaign, such inaccuracies as these were regularly reported through intelligence channels. The troops in the field, having learned caution in the use of maps, developed a technique for verifying map information. The first principle they learned to follow was: Check everything possible against the compass. The second principle was: Relate everything possible to one or more MAJOR TERRAIN FEATURES unmistakable on both ground and map.

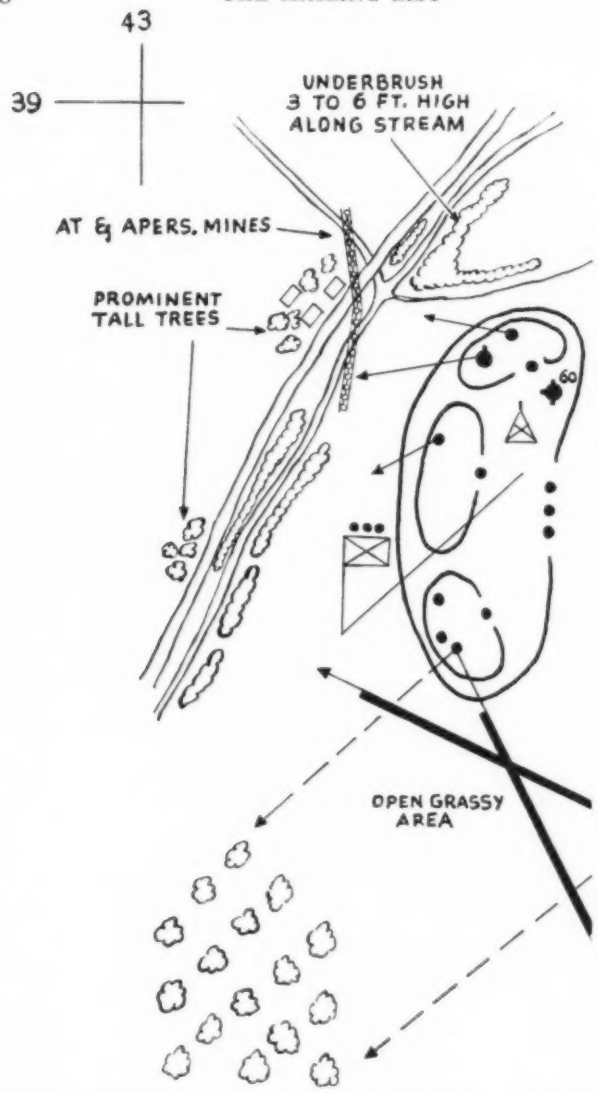
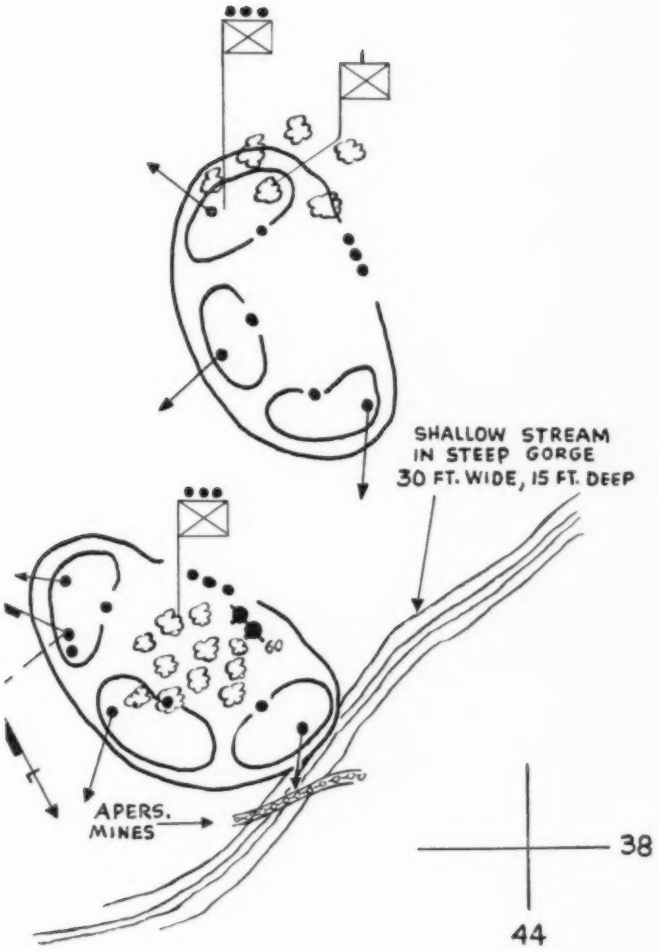


FIGURE 19.—This company sketch is a blow-up of a portion of the area shown in Figure 18.


SHALLOW STREAM
IN STEEP GORGE
30 FT. WIDE, 15 FT. DEEP
APERS.
MINES
38
44

Because of the unreliability of much map information on the condition of roads and the location of minor road junctions and crossroads, marching units often went astray until they learned to use the compass to check the direction of every road, instead of relying for identification on its supposed size or type of surface.

The tendency to rely on the accuracy of even a large scale map in its representation of minor terrain features, such as small draws and gullies, low knolls and outcroppings, was another source of error. It was eliminated when map users learned to look for *major* terrain features by which to orient themselves and to expect inaccuracy or omission of less important features. Orientation by means of major terrain features is the key to successful combat map reading.

While intersection and resection were occasionally useful in pinpointing an enemy or friendly position, polar coordinates were found simpler and were generally used. Most units had an SOP using polar coordinates which enabled them to transmit rapidly and with security, even by radio, information on the location of friendly troops.

Contact prints of aerial photographs were normally available within 12 hours after request. Data obtained from these was immediately plotted on the local maps, and the pictures themselves were then prepared as photomaps. One of the most valuable services rendered by the aerial photograph was the determination of the depth of woods. Maps were not always reliable in this respect, and the ground view often left the observer in doubt whether the trees through which he could not see constituted a hedgerow or the near edge of a forest. The aerial photograph left no doubt.

Battalion commanders, by the combined use of maps, aerial photographs, company sketches, and their own observation of the terrain were seldom without a clear picture of what lay before them.

CHAPTER 7

Chemical Mortars in Support of Infantry

In World War I our army had a small body of chemical combat troops. These were organized as the 1st Gas Regiment. This regiment fired poison gas, smoke, and incendiaries and gave close support to certain infantry regiments and battalions during the closing months of the war.

The chemical troops of World War I fired the Livens projector and the Stokes mortar. The Stokes was a 4-inch smooth-bore weapon. In the years following the war, considerable attention was given to improving the Stokes mortar and to the entire field of the tactical employment of chemical combat troops. The modern 4.2-inch mortar is the outgrowth of these improvements.

The chemical mortar of today is a heavy mortar with a rifled barrel and is capable of precise shooting. It is probably the lightest large-bore mortar in use and has a higher rate of fire than other heavy mortars. Its precision closely approximates that of the 105-mm howitzer, and its round carries a greater explosive charge. It outranges the 81-mm mortar, and its maximum rate of fire is nearly as great.

The chemical mortar is the basic weapon of today's chemical combat troops. These troops are organized (see fig. 20) as separate motorized battalions. The mortars, the mortar squads, and the prescribed loads of ammunition are carried in $\frac{1}{4}$-ton vehicles. The battalion has heavier vehicles in the ammunition train and for other supply purposes. This battalion has great mobility and is capable of giving close support to the infantry on most terrain and in most tactical situations.

For many years our tactical doctrine gave chemical combat troops the mission of firing smoke, gas, and incendiaries in support of infantry operations. With the improvement of the chemical mortar and the adoption of an HE round, the doctrine was adapted to include the firing of HE in the mission of the chemical troops. This chapter will be limited to a discussion of the tactical use of the chemical troops in firing smoke and HE in support of infantry.

ATTACHMENT TO INFANTRY UNITS

Chemical mortar battalions are army troops and are attached to divisions or corps for special operations. The usual basis of attachment is one chemical mortar battalion to an infantry division. The division commander, when such attachment is made, is faced with the problem of how best to use chemical troops to assure maximum close support.

If he holds the chemical mortar battalion under division control and fires it as a unit, it will be possible to mass the fires of all 36 of the battalion's mortars on a single target. Because of the rapid rate of fire and the large TNT load per round, the massed fire of one of these battalions, using HE ammunition, places more explosive upon the target than can be placed there by the massed fires of all of the division artillery. Such massing will enable the division commander to strike solid enemy resistance with an overwhelming volume of fire at the critical moment in the battle.

The division commander may decide, however, to break the chemical mortar battalion down to its three component mortar companies and to attach these companies to his infantry regiments or to combat teams. If he does this, he will seldom be able to mass the fires of the entire battalion upon a single target. Under this scheme of attachment, however, the mortars will be able to give closer support to the infantry regiments and battalions.

When a chemical mortar company is attached to an infantry regiment, the regimental commander has available the fire of 12 mortars, a volume greater than that of an artillery battalion, and can call for the massing of these fires upon targets within his regiment's zone of action.

In addition to these two schemes of attachment of chemical troops, others suggest themselves. Following is a summary of some of the more logical ways of attaching chemical troops for close support of infantry:

1. The chemical mortar battalion held under division control and fired as a unit (see above).

2. The chemical mortar battalion attached to the division artillery and fired under the direction of the division artillery commander.

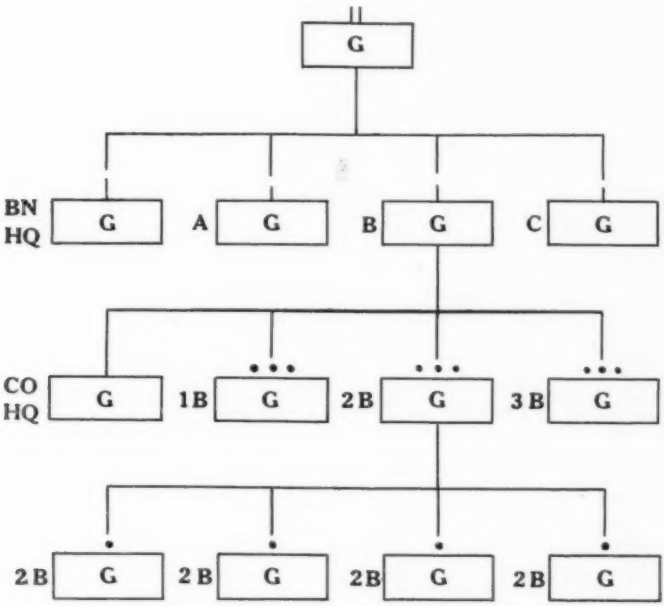


FIGURE 20.—Organization of a chemical mortar battalion.

3. The chemical mortar battalion broken down to the component mortar companies, and the companies attached to infantry regiments or combat teams (see above).

4. One or two mortar companies attached to infantry regiments, and the chemical mortar battalion (less the attached companies) held under division control.

All of these methods of attachment have been used in the present war. However, in the great majority of cases, the chemical mortar battalions have been broken down to companies, and the companies attached to infantry regiments or to combat teams. The present discussion of the tactical employment of chemical troops will be restricted to this method of employment.

When a mortar company is attached to an infantry regiment, the regimental commander is faced with the problem of how best to use the company in order to secure the maximum of close support for his battalions. If he holds the company under regimental control and fights it as a unit, he will be able to mass the fires of the three mortar platoons upon strong enemy resistance and, in general, apply this massed fire upon the enemy at the critical point and at the critical time. If he breaks the company down to its component platoons and attaches the platoons to his battalions, the battalions will receive the maximum of close support from the heavy mortars, but, it will seldom be possible to mass the fires of the three platoons upon a single target. The choices open to the regimental commander are:

1. Hold the attached mortar company under regimental control and fire it as a unit.

2. Break the company down to its component platoons and attach the platoons to infantry battalions.

3. Attach the mortar company (less one platoon) to the infantry battalion making the main effort and the remaining platoon to the second battalion in the line.

It must be kept in mind that chemical units cannot mass their fires with the ease of artillery batteries and battalions. Among the reasons for this are the following:

1. The chemical mortar has less range than the various artillery pieces.

2. The mortar also has less flexibility, that is, it can be deflected fewer mils either side of base deflection.

3. Chemical troops cannot, owing to lack of personnel and equipment, set up communications and fire-direction centers as elaborate as those habitually used by the artillery.

Combat experience indicates that, taking all these factors into consideration, the regimental commander will, on most terrain and in most tactical situations, make the most effective use of an attached mortar company if he holds it as a unit under regimental control for offensive fighting, and breaks it down to platoons and attaches the platoons to his battalions for defensive fighting.

Owing to the weight of the 4.2-inch chemical mortar round, and to the rapidity with which this ammunition may be expended, the supply of a chemical unit requires careful planning and the services of a substantial number of men and vehicles. The chemical battalion contains personnel specifically trained in supply functions and has heavy motor transport with which to perform them. For these reasons, it is sound practice for the commander of an infantry unit having chemical troops attached to leave supervision of the supply of these troops in the hands of their own commander; however, he is responsible for supply of these units, as for that of all attached units. So long as proper liaison is maintained, the chemical unit commander will have accurate and timely information of the infantry commander's plans and of the missions which the chemical troops may be called on to perform. The chemical unit's organic supply organization, acting on this information, makes the unit self-sufficient. Even when a chemical mortar battalion's components are attached to units or combat teams widely separated on an extended front, the battalion's supply organization, broken down in a corresponding manner, will usually continue to be adequate.

TACTICAL EMPLOYMENT

Chemical mortars should not be used to supplement the fires of infantry mortars, nor should they be used as a substitute for artillery. They should not be used for the destruction of targets requiring precision fire if the targets can be engaged by artillery. The greatest value of chemical mortars in support of infantry operations lies in the heavy volume of HE which they can deliver to neutralize area targets and in their ability to lay extensive smoke screens.

Certain general rules can be laid down for their tactical employment and the selection of suitable targets.

In the Attack

Push the mortars forward and build up stocks of ammunition, usually at a battalion ammunition supply point several thousand yards in rear of the line of departure, from which the mortar positions are kept supplied by their ¼-ton trucks.

Use massed fire power to neutralize the enemy's organized positions and to blast his field works.

Fire to prevent the enemy from changing the disposition of his troops.

Lay smoke screens as required.

After the objective is gained, immediately register on all avenues of approach which the enemy might use in his counterattack.

In the Defense

Place the mortars in positions from which they can lay heavy concentrations of HE in front of the main line of resistance and also fire to support a counterattack.

Assign normal and emergency barrages.

Include the firing of both HE and smoke in counterattack plans.

In a Stabilized Situation

Fire freely to wear the enemy down; reports indicate that he fears the fire of our chemical mortars. Study the terrain and the road and trail network and then fire to interfere with the movement of his troops and supplies.

The principles of sound tactical employment of attached chemical troops are illustrated in Figure 21, a schematic representation of an attack situation.

The infantry regimental commander has decided, considering the terrain and the enemy dispositions, to make his main effort on the right. He has also decided to hold the attached mortar company under regimental control and to

use the fires of the three platoons of the company primarily to support his 1st Battalion in the attack. His plan for the fires of the mortar platoons, as worked out with the mortar company commander, are as follows:

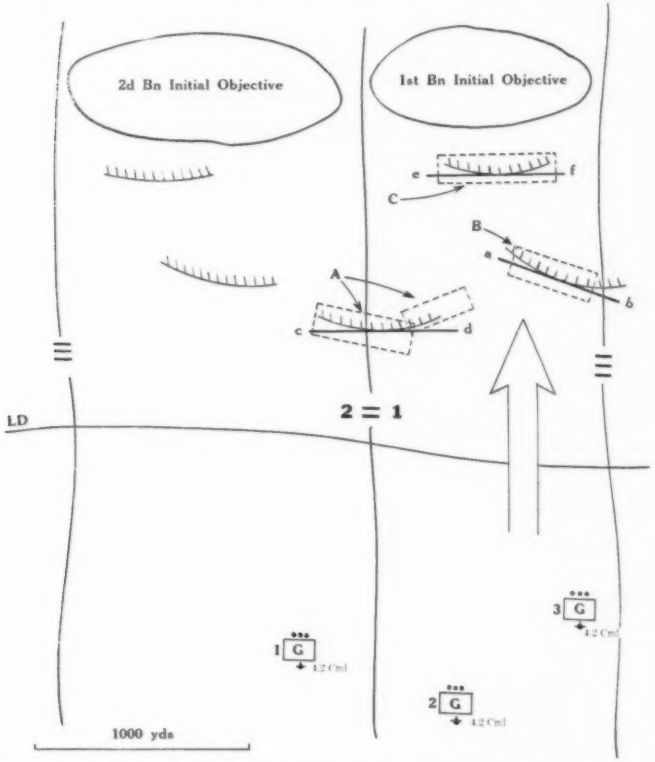


FIGURE 21.—Chemical mortar company, under regimental control, in support of attack by two battalions, with the main effort on the right.

1. From H minus 2 minutes to H plus 20 minutes, the 1st Platoon will screen the line *cd*; the 2d Platoon will screen the line *ef;* the 3d Platoon will screen the line *ab*. They are to fire WP, thus obtaining both screening and casualty effect. Under cover of this screen, the infantry will advance

to its assault positions. Note that the chemical mortars are to commence firing two minutes before H hour, so that their screen will be well established at H hour.

2. From H plus 20 minutes to H plus 25 minutes, the company will fire support concentrations upon targets A and B. The concentrations are to be 50 per cent HE and 50 per cent WP, fired at the maximum rate. The 1st and 2d Platoons will engage target A; the 3d Platoon will engage target B.

3. At H plus 25 minutes, the 2d Platoon will again screen the line *ef* and will lift this screen on call. The 2d and 3d Platoons will be prepared to fire a 5-minute concentration of mixed HE and WP upon target C, either when the screen on line *ef* is lifted, or on call.

4. At H plus 25 minutes the 1st Platoon will be prepared to fire, on call, in support of the 2d Battalion.

5. Immediately after the initial objectives are captured, the 2d and 3d Platoons will adjust fire on all likely avenues of approach to the newly captured objective of the 1st Battalion and be prepared to fire, on call, concentrations of HE or mixed HE and WP to assist in repelling a counterattack.

6. The 1st Platoon will be prepared to assist the 2d Battalion to repulse any counterattack launched after the 2d Battalion has captured its initial objective.

7. When the advance is resumed, the 2d and 3d Platoons will be prepared to fire support concentrations of HE or mixed HE and WP upon enemy troop concentrations or strong points and to lay smoke screens within the zone of the 1st Battalion.

8. The 1st Platoon will be prepared, when the advance is resumed, to support the 2d Battalion by firing concentrations of HE or mixed HE and WP within its zone.

9. The mortar company commander establishes liaison with the attacking infantry battalions and plans to furnish such observers as the terrain and the tactical situation dictate.

Variations of this plan are possible. As outlined, it is simple and workable and provides for: smoke screens to cover the advance of the infantry to assault positions; the

massed fire power of the chemical mortars upon the enemy positions just prior to the assault; concentrations to assist in repelling counterattacks; concentrations and smoke screens in support of the continuation of the attack; liaison and observer teams as necessary.

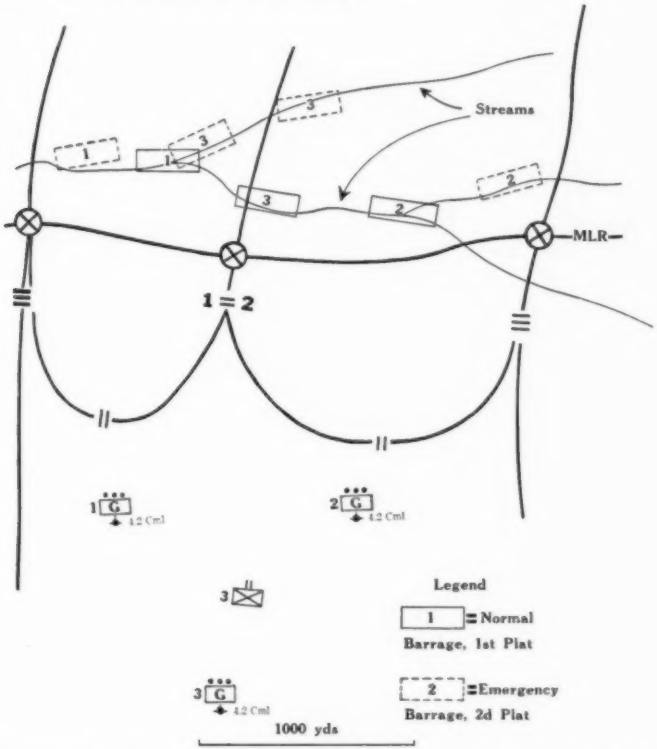


FIGURE 22.—Platoons of a chemical mortar company attached to infantry battalions in the defense. The area to be covered by a 4.2-inch chemical mortar barrage is not rigidly prescribed, and may be varied depending on the degree of concentration of fire desired. A platoon barrage area 400 by 100 yards is usual. The area is often smaller, rarely larger.

Figure 22 shows, in schematic form, an infantry regiment, with mortar company attached, in the defense. The regimental commander has broken the attached mortar

company down to its component platoons and has attached a platoon to each of his battalions. The battalion commanders have assigned the platoons positions from which each can place fire upon targets to the front of the regiment and also support a counterattack in the area of the battalion to which it is attached.

Each platoon has been assigned one normal barrage and one or more emergency barrages. The normal barrages are a part of the final protective fires. The planned barrages enable the battalion commanders to place a large volume of fire quickly upon enemy troop concentrations, and upon enemy troops as they move toward the main line of resistance. Each battalion commander also makes provision for employment of the attached mortar platoon in his counterattack plans. In support of a counterattack, the mortar platoons fire concentrations of HE or mixed HE and WP, as well as smoke.

Any plan for the use of attached mortar platoons in the defense should provide for: normal barrages as part of the final protective fires; emergency barrages on likely avenues of approach to the main line of resistance; fires in support of planned counterattacks; position areas from which the chemical troops can fire these missions.

FIRE CONTROL AND ADJUSTMENT

The mortar company, or platoon commander, as the case may be, establishes one or more OPs manned by chemical personnel, for his unit. These OPs are normally located near the OPs of the infantry battalions, to facilitate liaison. The fires of the mortars may be controlled entirely from the OPs. However, if observation from the OPs is in any way limited, the commander of the chemical unit may send out one or more forward-observer parties. When both chemical and artillery forward observers are operating with an infantry unit, the infantry commander may direct that the two parties work in the same general vicinity so that he will be able to consult with both at the same time, especially when he is in doubt as to which weapons should engage a particular target.

Infantry officers should be able to adjust chemical mortar fire, so that in an emergency, with no observer from a chemical unit available, fire may still be delivered on important targets. Adjustments by any of the simple methods described below, while slower than adjustment by personnel trained in the technique of fire, will nevertheless secure satisfactory results.

First Method

Figure 23 outlines a situation in which chemical mortars are firing as a company. All platoons have adjusted on base point No. 1. An infantry officer, located at the OP, is in communication with the chemical fire-direction center. He desires mortar fire placed upon the area in which the enemy machine guns are located. He has a map but does not know the location of the mortars and does not know that the church is a base point for the mortars.

The infantry observer informs the fire-direction center of his approximate location and describes the target which he wants engaged. He also describes, as closely as possible, the location of the center of his target. The fire-direction center then informs the observer of the designation of the target as "concentration 10" (or other number). The fire-direction center then describes base point No. 1 and learns that the infantry observer can see the church. The infantry observer is told that the 2d Platoon will fire the mission and is informed of the location of this platoon.

The infantry observer now knows the location of the nearest base point and the position of the platoon which will fire his mission. On his map he draws the mortar-target line, then locates it approximately on the ground. He is now ready to adjust the fire of the platoon upon his target area.

He designates his target and its location about as follows: "Enemy machine guns, center of target 250 yards left and 500 yards short of base point No. 1." (It is not necessary that he use these exact words but only that he transmit the information.)

Since this is an area target, it is likely that the fire-direction center will fire the platoon by salvo and on a 200-yard sheaf. This means that the 4 mortars will fire at 2-second

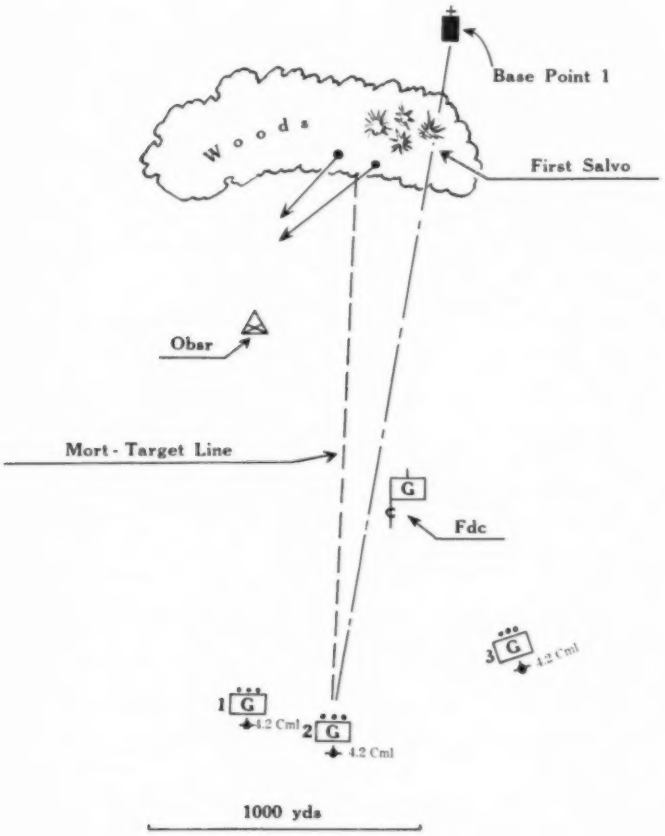


FIGURE 23.—Adjustment of fire when observer has map and can see base point on which chemical mortars have previously registered.

intervals, starting with the mortar on the right, and that the 4 rounds will impact along a line approximately 200 yards

in length. When all 4 rounds have been fired, the fire-direction center will report to the observer: "Rounds on the way."

The first salvo impacts as shown in Figure 23. The observer now estimates the direction and distance of the center of his target from the center of impact and reports: "Center of target 100 yards short and 100 yards left of center of impact." He continues such adjustment with succeeding salvos, until he has the mortar rounds impacting upon the target. He reports this by ordering: "Fire for effect." When the machine guns are silenced, he orders: "Cease firing."

This case is quite simple, because the observer has a map and can determine the mortar-target line. He can also see a base point upon which the mortars have already adjusted.

Second Method

Suppose, however, that the observer has no map and that the mortars have not adjusted on any base point within his field of vision.

Again, he first describes his position. He may be able to do this by describing natural or artificial terrain features in his vicinity. He may do it by stating, for example, that he is now in the center of the 2d Battalion zone and 1,000 yards north of the line of departure of the attack which was launched at 0630. By some such means he manages to describe his location, within a few hundred yards, to the fire-direction center. He then describes his target and gives its location with reference to his position.

The fire-direction center now fires a "ladder" in such a manner that the observer can see both the ladder and the target. The ladder consists of three rounds (smoke or HE) fired to impact along the mortar-target line, as estimated at the fire-direction center, and 300 yards apart (see fig. 24). The center round of the three is the last. The observer now knows the location of the mortar-target line and proceeds to adjust the fire of the platoon upon the target, using

the impact point of the center round of the ladder as his base point. In the case shown in Figure 24, he would report: "Center of target 300 yards left and 300 yards short."

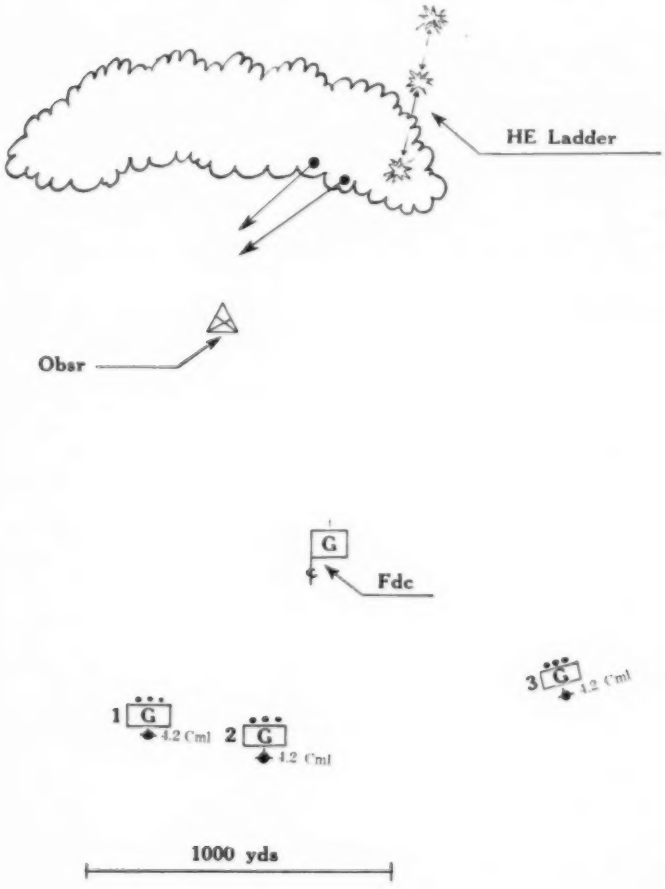


FIGURE 24.—Method of adjusting fire when observer is without map and unable to see base point upon which chemical mortars have registered.

The platoon now fires by salvo, as in the first method described. The observer reports the location of the target with reference to the center of impact of each salvo, until able to command, "Fire for effect," and "Cease firing."

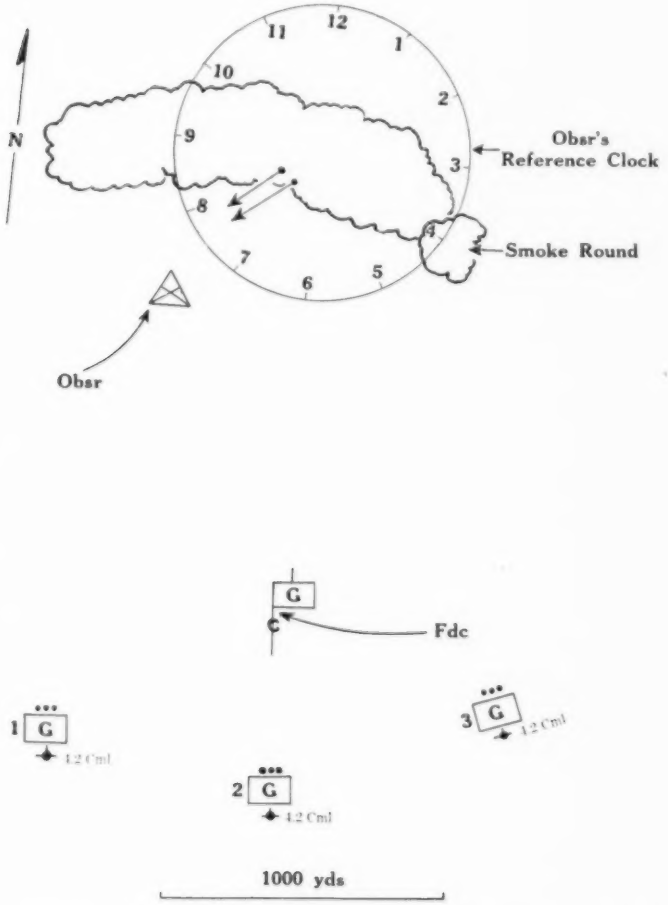


FIGURE 25.—Adjustment of fire using imaginary clock face to indicate relative positions of target and impact point.

Third Method

There is another method which lends itself especially to use by individuals who are not highly skilled at adjusting these fires.

In this method, the observer describes the location of the target with sufficient accuracy to enable a mortar to drop a round where he can see it. He then indicates the location of the impact point with reference to the target by referring to the face of a clock. That is, he assumes that the center of his target is the center of a clock face drawn on the ground and that 12 o'clock, on the face of the imaginary clock, lies to the north of the target. This type of adjustment is usually made with smoke, because it can be seen at a great distance. The platoon will probably fire only one mortar until the rounds are falling fairly close to the target and will then commence to fire HE by salvo.

Figure 25 shows this method of adjustment in diagram form. The platoon has fired its first round. The observer reports: "Smoke round 400 yards at 4 o'clock." The fire-direction center makes its correction and continues to fire, and the observer reports each round in a similiar manner. At the proper times, as described for the other methods of adjustment, the observer commands, "Fire for effect," and, "Cease firing."

LIAISON

The commander of the infantry regiment to which chemical troops are attached must decide what liaison he wishes the chemical unit commander to establish with his battalions and what OPs or forward observers he desires. Normally, he will ask the commander of the chemical troops for recommendations on these points. The infantry commander must remember, however, that the commander of the chemical troops has only a limited number of men available for duty as forward observers and liaison officers.

Each mortar company is authorized 10 field telephones, 10 miles of field wire, 10 miles of assault wire and 4 sound-powered telephone circuits (8 sets). The battalion head-

quarters company has an additional 4 miles of field wire. 4 miles of assault wire, 3 field telephones, and 1 sound-powered circuit. The radios are those employed by the infantry, so that netting, if it becomes necessary, is easily

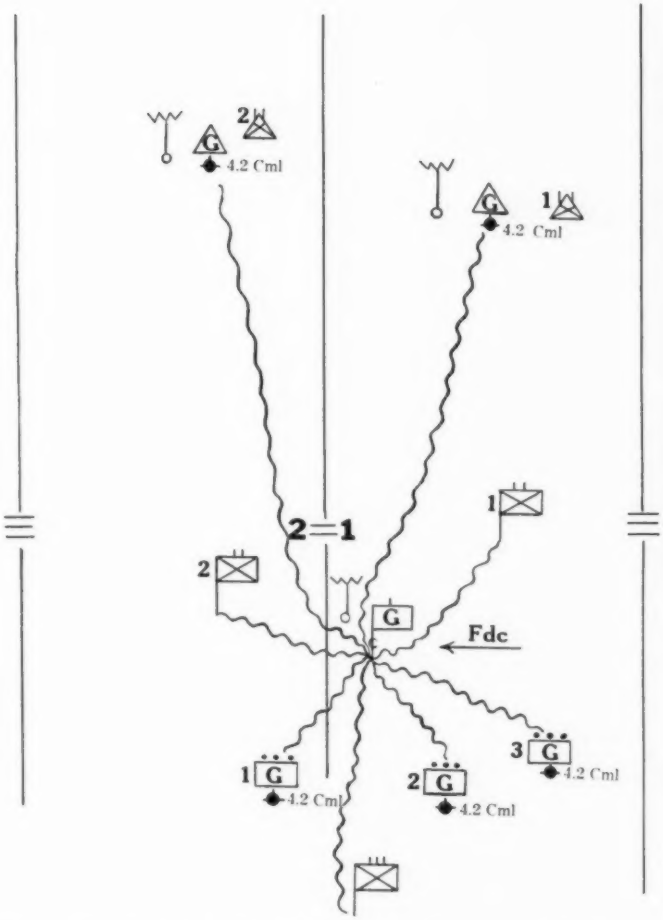


FIGURE 26.—Communication net of a chemical mortar company, under regimental control, supporting two battalions in an attack.

accomplished. There are 8 SCR 300s, 1 SCR 619, and 1 SCR 694 per mortar company. There are 1 SCR 193, 1 SCR 619, and 2 SCR 694s per battalion headquarters company.

Figure 26 shows, in schematic form, the wire laid and the positions taken by the chemical forward observers in a typical situation. The infantry regiment is to attack, and the regimental commander is holding the attached mortar company under regimental control. The mortar company has set up a fire-direction center and has established liaison with the regiment. It has sent a forward observer to an observation post near each infantry battalion OP.

There will be many cases in which the chemical observers will not be able properly to observe the fire of their mortars from such conveniently located positions. Under such circumstances they must move forward with the rifle companies, and other personnel from the mortar company must replace them at the OPs in order to insure unbroken maintenance of liaison.

CHAPTER 8

We Learned the Hard Way

A Graphic Portfolio of Advice on Jungle Fighting

American troops learned how to fight the enemy on the tropical islands of the Pacific by a process of trial and error. Since the first of the jungle campaigns, training literature embodying the things they learned has been made available in increasing volume to troops in training, while the training itself has been modified appropriately.

It is, however, difficult to reproduce jungle conditions in most training areas. As a result, most troops in their first experience of jungle fighting find the conditions unnatural. To some extent, they must accustom themselves to jungle conditions by the same process of trial and error undergone by earlier units.

The drawings which follow are the work of an enlisted man who served for 30 months in the South Pacific area, much of the time in active operations on Guadalcanal and Bougainville. They are a partial record of this process of trial and error during action, as seen by the artist himself. Most of the points illustrated are specifically made in the recently revised manual on jungle warfare (FM 72-20). They are of such importance, it is believed that presenting them in graphic form will be of material assistance in driving home to those who follow the lessons learned at such cost by the pioneers in this type of warfare.

FIGURE 27.—Instinctive fear of the jungle is often greater than fear of the enemy.[1] The resultant mental strain, if fear of the jungle is not overcome, will eventually lower combat efficiency.[2] Fear of jungle sounds, for example, can be overcome when troops learn to distinguish those which are natural from those which are man-made.[3]

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[1]FM 72-20, par. 1. "In jungle warfare, the soldier often fights two enemies: man and nature . . . The soldier must be trained not to fight the jungle; he must be capable of living successfully in it and making it work for him against the human enemy."

[2]FM 72-20, par. 8. "Limited visibility increases the feeling of insecurity, strange noises assume an increased importance, and men tend to become jumpy and panicky."

[3]FM 72-20, par. 58*a*. "Men should be trained to listen for the normal night sounds of the jungle. Any cessation of these noises is fair warning that something is abroad which is disturbing night life."

FIGURE 28.—Individual equipment should be kept at a minimum, because physical exhaustion comes rapidly in the jungle's hot, humid atmosphere.[4] These soldiers, laden with souvenirs, as well as their own equipment, are wasting energy which they may need to accomplish their mission.

[4]FM 72-20, par. 31*a*. "Every effort should be made to reduce to the minimum the amount of equipment to be used."

FIGURE 29.—Most jungle terrain is not level. Much of it is broken by sharp elevations and depressions.[5] This scene shows heavy equipment being passed from hand to hand up a steep slope—a method often less exhausting to the men than the carrying of individual loads.[6]

[5]FM 72-20, par. 2*c*. "Water courses . . . following deep precipitous gorges and gulches, add to the interruptions to progress which the jungle itself presents."

[6]FM 72-20, par. 82*a*. "The basic means of jungle transport is hand-carry."

FIGURE 30.—All movement in the jungle should be made as silently as possible.[7] The enemy is not frightened by the noise we make; he is merely alerted. Loud conversation, shouted orders, or rattling equipment are invitations to ambush.[8] If there are enemy in the vicinity, some of the talkative soldiers in this picture may not live to regret their carelessness.

[7] FM 72-20, par. 27. "One of the primary requisites of jungle operations is stealth."

[8] FM 72-20, par. 56*h*(1)(*b*). "Talking is prohibited except to transmit whispered orders or instructions."

FIGURE 31.—Existing good concealment is the rule, rather than the exception, in the jungle, but this fact should not lead to carelessness when an open area is encountered.[9,10] The enemy's observation is often good, and it is as dangerous for men or vehicles to expose themselves on a skyline in the jungle as it is anywhere else.

[9]FM 72-20, par. 15. "The jungle provides ideal concealment for both offensive operations and for defensive positions."

[10]FM 72-20, par. 2*b* and *c*. "The low-lying foothills . . . are frequently open to the sunlight . . . The jungle proper is frequently interrupted by broad grassy savannas or other open spaces."

FIGURE 32.—The enemy is adept at concealing himself and is very patient. He will lie hidden almost indefinitely for a chance of firing at us from the rear.[11] Therefore, troops should not be moved into a new area until it has been combed for lurking enemy. This drawing shows what may happen when the precaution is neglected.

[11]FM 72-20, par. 26. "The jungle fighter must be constantly suspicious. The high degree of concealment which the jungle offers requires slow and careful searching for the enemy . . . It is best to assume that the enemy is always nearby, watching and listening."

FIGURE 33.—Few jungle maps are detailed or reliable.[12] Aerial photographs may be more useful, and should be consulted by members of a patrol before commencing their mission. The use of both vertical and oblique photos and the assistance of a trained photo-interpreter are advisable.[13] Each member of the patrol, not merely the patrol leader, should have all possible advance information of the mission and the terrain to be traversed.[14]

[12]FM 72-20, par. 40*c*. "Maps are seldom dependable for accurate portrayal of roads and trails."

[13]FM 72-20, par. 48*a*. "Reconnaissance by air photos, including mosaics and strips, is valuable in that such natural features as rivers, lagoons, inlets, offshore coral formations, and such works of man as coconut plantations, native gardens, and villages are clearly delineated; vertical photos, however, will not reveal terrain details hidden by a solid jungle canopy. Obliques will reveal the contours of the ground, though not to scale, and with considerable distortion. The most desirable types of air photos are stereo-pairs and vectographs."

[14]FM 72-20, par. 76*g*. "All members of the patrol must know in detail just what information is to be secured, and the leader's plan for securing it. They must know where the patrol is going, time and place to which it is to return, and their own jobs."

FIGURE 34.—A patrol is not doing its job if it merely passes through an area, as this one is doing. It must make a thorough search, as the enemy does not reveal himself until it seems profitable to him to do so.[15] Certain members of a patrol will frequently be assigned particular directions or sectors of observation for which they are responsible.[16]

[15]FM 72-20, par. 26. "Elements assigned security missions must search every possible hiding place to prevent the bypassing of enemy groups which might thereby be enabled to attack from the flanks or rear."

[16]FM 72-20, par. 76*b*. "The leading man (of a three-man patrol) gives his entire attention to observing the ground to the front and flanks, the second concentrates on observing for tree targets, and the third furnishes the fire power for protection of the group, and observes to the rear."

FIGURE 35.—Jungle bivouacs, especially of large units, are usually made during daylight, in order to eliminate all possible movement above ground after dark.[17] However, a patrol in enemy territory may be under observation when it bivouacs and thereby risk an attack in force at night. A ruse that has been successfully used by patrols in such circumstances is to make a daylight bivouac and, immediately after dark, move to another previously selected location.[18]

[17] FM 72-20, par. 57*d*. "The halt for the night (by a battalion) should be made some time between 1430 and 1600 in order to establish the bivouac before darkness."

[18] FM 72-20, par. 57*o*. "With a unit the size of a company, it is desirable to halt at about 1500, feed, clean weapons, answer calls of nature, change socks and so forth in one area and then, about 45 minutes before dark, move to a night bivouac area previously selected and reconnoitered."

FIGURE 36.—Many soldiers have a tendency to freeze into immobility when fired on in the jungle. But, since the enemy's fire quite certainly means that he has located you, it is almost always better either to move to shelter or to advance against him.[19] Good nearby shelter exists in the terrain illustrated here.

[19]FM 72-20, par. 77*b*(3). "Although the victims may be surprised by the ambush, rapid movement for only a short distance will usually place them beyond immediate danger."

FIGURE 37.—Visibility in the jungle is so limited that it is especially important to preserve contact between units.[20] If this principle is neglected, troops may suddenly find that their flank contact is with the enemy.

[20]FM 72-20, par. 11. "In many cases visibility is limited to as little as 20 feet. This makes contact and control one of the most difficult problems of jungle warfare, and considerably increases the responsibilities of small-unit leaders."

FIGURE 38.—Men caught in a flare at night should move instantly to cover or away from the area.[19] The chances are that the enemy fired the flare because he detected their presence and needs only to locate them exactly before opening fire.

FIGURE 39.—The enemy employs many ruses at night to draw fire from our automatic weapons. He may want targets for his mortars, or he may want to locate our flanks. Strict orders as to which weapons may fire, and under what conditions, are always issued for a night defensive position.[21] Failure to follow these orders may endanger the entire unit.

[21] **FM** 72-20, par. 73*b*. "Strict fire discipline must be maintained, particularly during darkness. The primary weapon for defense against night attacks is the hand grenade. Knives, bayonets, and machetes are also used. Rifles and automatic weapons are fired only in the greatest emergency or when grenades are gone, since their flash discloses the location of the defender to the enemy."

FIGURE 40.—Machine-gun fire should be kept low. Unless it is close to the ground, the enemy may be able to creep in under it. This is especially important when it is necessary to fire at night, as the enemy will be unobserved until very close to the position.

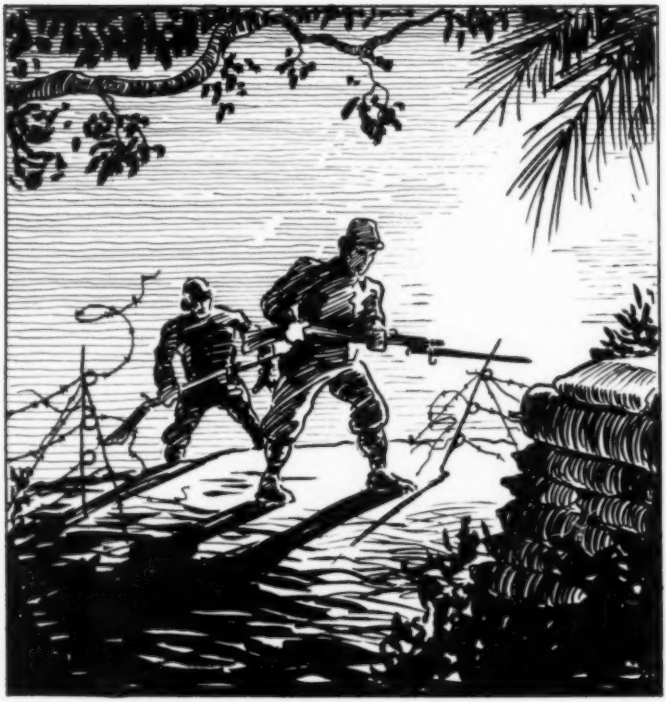

FIGURE 41.—Protective wire should be strung tight. Tight wire gives forth a loud, distinctive sound when cut. Loosely strung wire can be cut quietly, and may enable the enemy to pass through it at night undetected.

FIGURE 42.—Rear-area installations, located, for convenience, near important roads or trails, are easily spotted by the enemy. Time and effort spent in camouflaging such an installation may be relatively ineffective if the location was poor to begin with.

FIGURE 43.—The desire to police up rear areas may cause neglect of proper camouflage and concealment. Cleaning out undergrowth, lining up tents and buildings, and widening and improving paths and trails make the installation a conspicuous target for enemy air and artillery.

FIGURE 44.—The enemy infiltrates our lines skillfully and boldly with patrols as small as two men. No rear area is safe from surprise attack. *All* installations therefore should be protected by perimeter defenses partially manned at all times.[22] In addition, a 24-hour guard should be maintained on air strips, motor parks, supply dumps, and so forth.

[22]FM 72-20, par. 47*d*. "All positions, no matter how remote from the foremost troops, are likely to be attacked at any time. Security must be obtained by laying out positions in the form of a perimeter capable of all-around defense. Every officer and man must have an alarm post, and everybody must be ready to fight. This includes personnel of all headquarters and all supply installations."

FIGURE 45.—Our troops have good air cover and support. Big patrol bombers like this one, usually operating in pairs, are excellent spotters because of their ability to remain over an area for extended periods. They keep enemy artillery silent for fear of revealing its positions and locate targets for our own weapons.[23]

[23]FM 72-20, par. 53*b*. "Although observation aviation has only limited usefulness in discovering and tracking an enemy moving through the jungle, air observers will often be an effective aid in adjusting artillery fires."

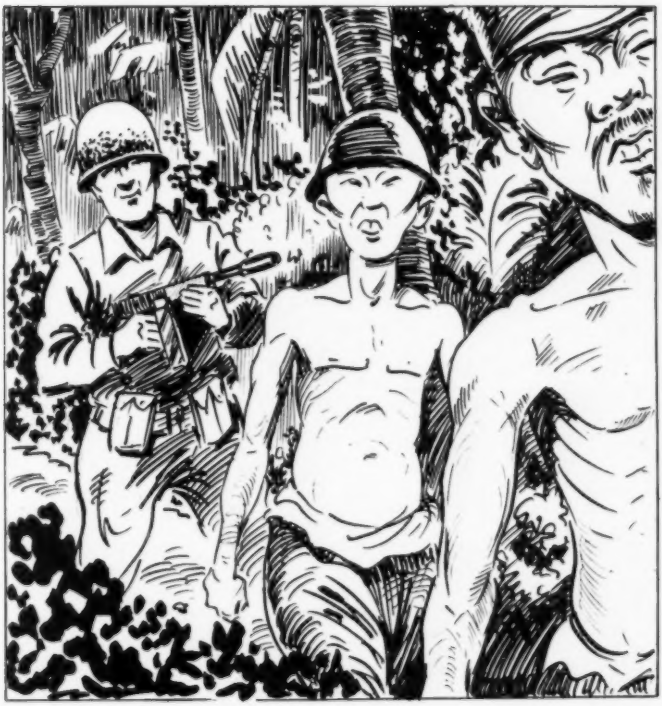

FIGURE 46.—Enemy prisoners are extremely valuable to our intelligence personnel and should be captured and brought in, after stripping and searching, whenever possible.[24] It is equally important to bring in all documents found on them. Soldiers should acquire the ability to recognize some written enemy characters of military significance and to interpret enemy identification tags.

[24]FM 72-20, par. 62*h*. "A steady flow of prisoners at all times is highly desirable for intelligence purposes."

CHAPTER 9

Combat Intelligence and the Small-Unit Leader

The erroneous idea has developed in the minds of many officers that combat intelligence is a function of command only in battalion and higher echelons. As a matter of fact, company commanders and platoon leaders have, within their own units, a responsibility for the production of combat intelligence differing only in degree from that of division and corps commanders. The production of combat intelligence is the continuing duty of *all* unit commanders.

Unfortunately, it is difficult to simulate, in training, those combat conditions in which prompt, accurate, and complete information of the enemy becomes a vital necessity. Consequently, many small-unit leaders fail to prepare themselves and their commands adequately for the intelligence duties which must be performed in battle. The battlefield itself, however, with its noise, confusion, and danger is a poor place in which to begin to learn one's duties. As with every other phase of preparation, unless careful training and planning have been carried out in advance, the entire intelligence function may collapse.

Unit commanders are usually aided in performing command functions by special table-of-organization assistants. No clearly defined intelligence sections, however, are provided for the infantry company commander. Nevertheless, he is not without assistants. Within the company, he has several highly useful agencies which, properly employed, will do much to dispel some of the fog and uncertainty of battle. The company commander must know what these agencies are and what they can or cannot do.

Some small-unit leaders, lacking battle experience, fail to recognize this function of command as a continuing duty. "Let battalion take care of that," they say. "What's the S-2 doing up there, anyhow? I've got enough on my mind." Yet the production of enemy intelligence is not only a duty—it may be also a matter of self-preservation. Tragic failures have resulted, in this war as in others, from the neglect or improper application of combat intelligence. What is essential to emphasize is this fact: The platoon leader or company commander who depends entirely on higher headquarters as a source of enemy intelligence finds himself in the same unhappy situation as the battalion or regimental commander who depends entirely on higher units for his combat intelligence. It is not enough. All available agencies must be used.

Consider Captain X. His company was ordered to occupy HILL 136. Division reported that a staff officer had been up on the hill the previous day, had walked all over it, and had found nobody there. Captain X would get no fire support, not even from the heavy-weapons company. Division said he didn't need it. The hill was 1,200 yards away, and he had an hour and a half to get up there. Move out!

Captain X moved out. But he wasn't satisfied. He had had his observation posts observing HILL 136 for two days, and the night before he had sent out a patrol to take a closer look. As far as he could make out, HILL 136 was defended by at least a reinforced enemy platoon, possibly by a company. So he wasn't taking any chances. He sent out strong patrols to both his flanks as he moved up the hill.

Four hours later, Captain X was in touch with battalion headquarters. He was halfway up HILL 136. He had done the best he could to carry out his orders. But his company had incurred heavy casualties; there was an enemy company holding the hill; he would lose most of his men if he tried to go much farther. Did battalion have any further instructions? Yes, the battalion commander's orders were to withdraw. The next day, the battalion made a coordinated attack and successfully occupied the position.

Unlike Captain X, too many small-unit leaders are content with the intelligence provided by battalion. Higher headquarters is an invaluable source of combat intelligence. But it is not the only source. Without *all* the information of the enemy, of terrain not under our control, and of enemy capabilities that he can obtain, a commander cannot make a satisfactory estimate of the situation, cannot arrive at a sound decision, and cannot execute his mission in the most effective manner.

In a stable situation, higher headquarters may provide a large proportion of the necessary combat intelligence. In a rapidly moving situation, on the other hand, it may be relatively out of touch with the tactical situation confronting the small-unit leader. At such a time, this small-unit leader of necessity becomes his own S-2. Generally speaking, the faster the situation moves, the lower the echelon which must directly seek information of the enemy.

Thus in modern warfare, the small-unit leader frequently finds himself faced with situations in which reliance solely upon higher headquarters for information of the enemy will be inadequate for his unit's needs. What then, is he supposed to do? Let us forget, at the outset, the more mysterious probings into enemy strength, disposition, capabilities, and the like which may go on at the battalion or higher level. The question is simply this: How is the small-unit leader going to provide himself with the combat intelligence he must have?

II

First, let us be sure we understand the terms we are using. The larger subject, military intelligence, we may define as evaluated and interpreted information of the enemy and of the terrain not under our control, together with conclusions drawn therefrom. Notice that information alone, either of the enemy or of enemy-held terrain, is not intelligence. It does not become intelligence until it has gone through a process of evaluation and interpretation. Combat

intelligence we may define as that military intelligence produced in the field after the outbreak of hostilities—or, more simply, as military intelligence produced in battle.

The process by which the commander provides himself and his subordinates with combat intelligence can be reduced to four steps. The whole combat-intelligence cycle involves (1) collecting and reporting information of the enemy and of the terrain not under our control, (2) recording the information, (3) evaluating and interpreting the information, and (4) distributing the evaluated and interpreted information. It is assumed that the commander has already decided what information of the enemy or of the terrain he most desires.

For purposes of illustration, let us consider the collecting agencies and other sources of information available to the rifle-company commander, bearing in mind that, with some variations, similar agencies and sources are available to all infantry companies. To assist him in collecting information, the rifle-company commander has certain specially qualified personnel within his own company, and also patrols, observation posts, adjacent units, and the individual soldiers of his command. In exceptional circumstances, he may also secure information from prisoners of war, civilians, deserters, and captured documents and materiel.

Within the rifle company there are 25 soldiers (fig. 47) who may be said to be specially qualified to secure and handle information of the enemy. These are the communication sergeant, the bugler, 5 observers (one with each of the crew-served weapons in the weapons platoon), and 18 scouts (2 in each rifle squad). These men constitute, in effect, the company intelligence personnel. They may be used in a variety of ways. When maps or sketches are not available, the communication sergeant and the bugler, who are specially trained in this work, may be employed in producing sketches of the terrain ahead—from actual observation, if necessary—as well as operation sketches and overlays. The observers of the weapons platoon may be utilized to supplement the work of the company observation post. The scouts

may man additional observation posts, accompany patrols, or constitute intelligence patrols by themselves.

The company commander knows that higher headquarters has an intelligence plan and a counterintelligence plan. He realizes that they are in operation and that their suc-

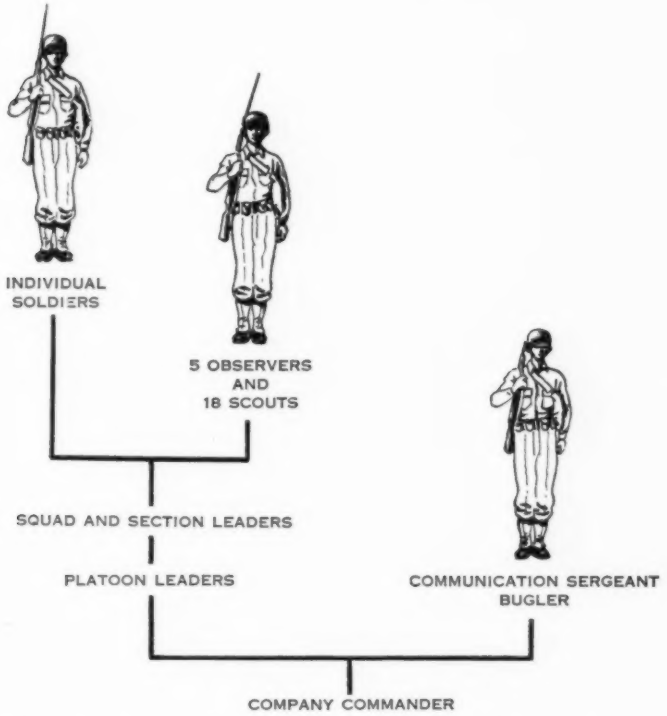

FIGURE 47.—Channels of communication within the rifle company providing the company commander with information of the enemy and enemy-held terrain—the raw material of combat intelligence

cessful execution will directly benefit his company, as well as the larger team of which the company is a part. He must try to convey his sense of the importance of these things to

the individual soldier so as to show him how every man in the company benefits from the seemingly aimless and often dangerous tasks he is given.

Not the least of these tasks are patrolling missions. Certain larger units have adopted the practice of forming special unit patrolling teams—regimental battle patrols, battalion patrol platoons, or whatever they may be called. This practice can seldom be carried out by units as small as a company. But, even though patrols may have been dispatched by higher headquarters, the company commander will frequently wish to send out some of his own personnel. He might, for instance, send a reconnaissance patrol to discover the specific location of a machine gun which is holding up the advance of his unit. Higher headquarters may know the approximate location of this weapon. But the small-unit leader has to know its location to within a few yards. For information of this sort he has to depend on his own initiative and resources. Patrolling therefore plays a considerable part in the collection of information about the enemy and enemy-held terrain.

Information of the enemy may also be collected and reported to the company headquarters by personnel manning the various observation posts. It should be remembered that the company commander is not limited to what is seen from his one, or perhaps two, company observation posts. He has two light machine guns and three 60-mm mortars, each with its own observation post or vantage point. Each of these subordinate observation posts acts as an additional eye for the unit commander. Through them he can secure information not available at the company observation post, and can check the accuracy of information which he receives from that post. Thus, he observes the same scene from different points of view and can more closely scrutinize various parts of the terrain before him. There will seldom be one perfect observation post from which he can obtain all the information he desires about his zone of action. Even if such a post existed, the personnel manning it would be subject to error. The small-unit commander might

as well blindfold himself as fail to make use of all available vantage points to observe the enemy and the terrain not under our control.

The company commander needs information of the enemy not only to his immediate front, but also in front of adjacent units—information of the enemy, that is, to his right and left front and flanks. He will secure some of this information through the cooperation of adjacent unit commanders, making doubly sure of getting it in time to be of use by instituting a system of liaison agents. These agents should be soldiers selected not so much for their high AGCT scores as for their common sense and physical stamina—for their ability to get the information required and then bring it back through bad weather, over rough terrain, or under enemy fire. The duties of these liaison agents would be similar to the duties of liaison officers at a higher level. They would be sent to adjacent company headquarters to secure answers to specific questions or to secure information desired as a matter of standing operating procedure. They should also be prepared to answer questions regarding the zone of action of their own unit. They should know whose shoulder to look over in the company command post to get the information required. And they should know enough about the tactics of the individual soldier to be able to move successfully in daylight or darkness and in any weather over strange terrain from one command post to another.

With these many agencies available to the company commander, he must have in mind constantly a logical and orderly plan for their use. He must give each agency specific missions, specific questions to answer; otherwise, items of paramount importance may be missed. Furthermore, through full understanding of the capabilities and limitations of each, he must coordinate the activities of his several agencies to gain the greatest aggregate success. To comprehend the mechanics of proper intelligence planning at the company level, let us consider the mental processes involved.

As the first step in his plan, the commander asks himself, "What do I have to find out about the enemy?" On a small scale he is performing the same job as that done by the higher commander who formally determines the EEI, or essential elements of information. The company commander next asks, "Who can get that information for me?" In the terminology of the higher headquarters, he is determining the agency to be used to secure the answer to his EEI.

Finally he asks, "What instructions must I give that agency?" and thus plans the directive necessary to have the agency secure the information desired and deliver it to him at the right time and place.

Of course, at company level many intelligence plans will be carried entirely in the head, and not written down. To emphasize the logical mental process involved in formulating a successful intelligence plan, let us look at an example from the present war wherein a company commander prepared a written plan.

Company A occupied positions shown on the sketch (fig. 48) prior to daylight. The assigned mission was to defend HILL 5 and prepare to advance to the north. The enemy was reported to hold TOWN 4, but this had not been confirmed. Captain Company A disposed his troops as shown, and by 0900 had prepared the following intelligence plan:

Co A, ... Inf	Int Plan	270900 Feb to 010900 Mar
Information Required	*Agency to be Used*	*Instructions*
1. Can CREEK 6 be crossed at BRIDGE 1? At FORD 2? By foot troops? By vehicles? Does enemy defend those points?	Patrols, 1st and 2d Plats.	A. 3-man patrol from 1st Plat to BRIDGE 1—out 2000, in 2200 — check if bridge defended or prepared for demolition. B. 3 men from 2d Plat to FORD 2 — check depth, width, current, type of bottom, whether defended—out 2215, in 2400.

Information Required	*Agency to be Used*	*Instructions*
2. Does enemy occupy WOODS 3?	Patrol, 2d Plat. Mortar OP.	A. Patrol 1st Sqd 2d Plat search WOODS 3—out 1400, in 1700. B. Mort OP observe during daylight hours.
3. Does enemy occupy TOWN 4?	Co. OP. Patrol, 3d Plat.	A. Co OP observe during daylight hours. B. If OP report negative, 10-man patrol from 3d Plat search town tomorrow night.
4. Are enemy patrols active?	Listening posts, 1st and 2d Plats.	Providing BRIDGE 1, FORD 2, and WOODS 3 not defended by enemy (see 1 and 2 above). A. Establish 4-man night listening post by 1st Plat at BRIDGE 1 starting tomorrow night. B. Same by 2d Plat at FORD 2.

As a result of the activity directed in this plan, Captain Company A discovered that BRIDGE 1 was prepared for demolition and defended by two men. WOODS 3 and FORD 2 were found to be undefended by the enemy, and FORD 2 turned out to be readily fordable by both vehicles and foot troops. During the day, the company observation post noted six enemy soldiers moving about in TOWN 4. These men took no precautions as to cover and concealment and were apparently unaware of the proximity of our forces. Even before evaluating and interpreting this information, Captain Company A reported each item of information directly to battalion as soon as he received it.

At 2330, on the same day that he entered the position, Captain Company A was ordered to move to the north, and occupy and defend TOWN 4 prior to 0800 on 28 February.

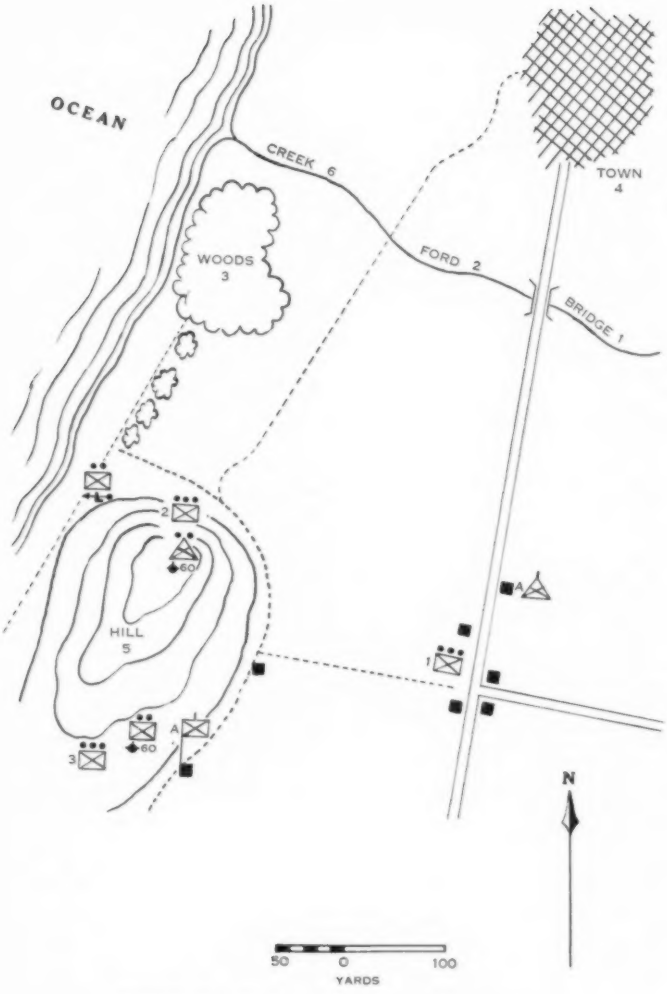

FIGURE 48.—Sketch of Company A's position.

As a result of his careful planning, he was in possession of sufficient information to insure that his attack would be launched in the most effective manner. His 2d Platoon entered TOWN 4 at 0530 by way of FORD 2. The 1st Platoon was to have seized BRIDGE 1 at the same time. Unfortunately, the enemy succeeded in blowing the bridge at the last minute. The town, however, was taken with only 17 casualties to the enemy's 39. Supply moved by way of FORD 2 until BRIDGE 1 was repaired.

III

In addition to such activity by specialist personnel, the small-unit leader can also expect, and should indeed insist, that information of the enemy and of terrain not under our control be transmitted to him by every soldier in his command. The soldier must be shown the reason for collecting and transmitting every scrap of information, however insignificant. When the soldier sees the enemy, he should report, as far as possible, the enemy's size, activity, location, unit designation, time seen, and equipment. He makes no deductions, draws no conclusions; he merely reports the facts. It must not be understood by this that he does not make *estimations*. Frequently this is a way of establishing a fact, but it should be reported as an estimation.

Under "size," the commander wants an exact figure; under "activity," precisely what is seen or heard. He needs the enemy's "location" pin-pointed by an azimuth, precise distance, reference to a known and definitely located terrain feature, or the like. He wants the exact hour when the enemy was seen, so that he can fit each item of information into a proper chronological sequence of the enemy's activities. He must have clear information about the enemy's activities, as well as his equipment and weapons.

When a company commander suspects that new troops are opposing him, his patrols become increasingly active in order to discover the strength and identity of the new unit. If he picks up a soldier from Company K on one flank and a second from Company K 900 yards away on the other flank,

he quickly realizes that Company K is strung out very thinly on a wide front. Identification of an enemy unit is of such value to intelligence officers of higher units that it has an urgent rating and must be reported to the representative of such units without delay. Similar information concerning our troops is of equal value to the enemy.

Information of the enemy's artillery (or any crew-served weapons) is also vital to all unit commanders. The speed of our advance is often determined by the rate at which we locate enemy artillery and force it to withdraw. Our artillery dispositions, if uncovered by the enemy, yield clear indications of our plan of operations. Similarly, a knowledge of the enemy's artillery dispositions gives us an excellent key to his plans. Of course, building the complete artillery picture is the task of artillery intelligence. The infantry can, however, materially help in this task and will directly benefit from doing so. The infantry soldier and small-unit leader, by transmitting shelling reports fully and frequently, can assist chiefly by reporting information of enemy artillery activity seen or heard. The company commander will require the individual soldier to report information not only about enemy artillery, but also about any enemy automatic and crew-served weapons, since the speed of the company's advance is determined by the speed with which enemy mortars, machine guns, and the like are located and neutralized or destroyed.

The time when the enemy was seen and also the terrain on which he was seen, in fact, any information about enemy-held terrain is often of great value. It is normal in battle that not all the desired information of the enemy will be available. Yet failure to act because of incomplete information is unpardonable. Besides, a thorough knowledge of the terrain ahead will often offset the disadvantage of incomplete information of the enemy, because his capabilities, as well as our own, are directly dependent on the terrain. Figure 49 shows a patrol obtaining detailed information about a stream in the zone of advance of its unit.

FIGURE 49.—This patrol will bring back exact information about the stream—its width, depth, rate of flow, type of bottom, and nature of banks.

All information of the terrain which the individual soldier secures and reports is valuable to the unit commander in estimating the situation and reaching a sound decision. Is there a good location for an observation post on that hill? A good field of fire? Is that creek fordable? Exactly where? Are there any mines along that trail through the woods? Any obstacles on this road?

IV

In exceptional circumstances, the small-unit commander may also secure information directly from prisoners of war, from captured documents, from civilians or deserters, and even from captured equipment and weapons. In seeking information from such sources, however, the company commander must bear two facts in mind.

First, it is a waste of time to try to question at length non-English-speaking prisoners, civilians, or deserters, or examine documents written in a foreign language without the help of an individual who has a comprehensive knowledge of that language. Interrogating, interpreting, and translating are highly technical jobs best performed by specialists at higher headquarters.

Second, the only information which the small-unit commander is permitted to seek from these sources is that which is of immediate tactical importance to his unit. In practice, this usually boils down to not more than three or four simple questions such as: "Are there any more of you around here? Where are your machine guns? Are there any booby traps in this pillbox? Where is the path through the mine field?"

In handling prisoners, the individual soldier should be taught to remember the four S's: search, segregate, silence, and speed. Prisoners are searched in the front lines primarily for weapons (fig. 50). They are searched for documents only at the point where such documents can be properly handled. In any event, front-line units must always make sure that documents, when taken, are properly identified with the prisoners on whom they are found. Prisoners

FIGURE 50.—Failure to search and, if necessary, strip prisoners, even when they are badly wounded may be disastrous.

are segregated at once into officer, noncommissioned-officer, and private groups. Additional separate groups are formed of civilians and deserters. (See fig. 51.) The prisoners are not permitted to talk, except to answer questions. Finally, and most important, they must be processed through the company with the utmost speed. They must be sent back to higher headquarters under guard at the earliest possible moment.

Civilians and deserters are handled in exactly the same manner as prisoners: They are processed quickly through the company and sent back to higher headquarters under guard. Any information which may be obtained from civilians or deserters should be evaluated with due consideration of its source, since less reliance can be placed on it than on information from ordinary prisoners of war.

It must be pounded in constantly to all men that souvenir hunting which involves pilfering documents or other belongings of prisoners is a practice which ultimately works to the disadvantage of all, including the collector. Documents often provide the only background by which an interrogator can open up a conversation with a prisoner. The absence of such documents, by preventing profitable interrogation, may cause important information, potentially available, to remain undiscovered.

New or unusual weapons and ammunition must also be safeguarded from souvenir hunters and their location reported to higher headquarters. Each unit normally establishes its own standing operating procedure for curbing the souvenir-hunting tendencies of the American soldier. These standing orders, violations of which seriously interfere with the work of higher commanders, must be strictly enforced.

V

By properly using all the agencies and sources available to him, the small-unit leader accomplishes the first step in the production of combat intelligence: collecting the information, the raw material. The second step is recording the information thus collected. This should be done in order

FIGURE 51.—Prisoners are segregated into groups of officers, noncommissioned officers and privates.

that the commander's assistants or successor may have easy access to it if necessary. At the company or lower level, the manner of recording varies with the individual's preference. As it comes in, the information may be recorded on a sketch, entered chronologically in a notebook, or retained in a file of the messages by which it was transmitted. Whatever method is employed, the information should be readily available in usable form.

Information by itself, however, is only the raw material of combat intelligence. After information has been collected and recorded, it must go through a third step, which the small-unit leader will no doubt wish to perform for himself. He must decide what the information is worth and what it means. He must evaluate and interpret the information he receives by weighing its credibility, reliability, accuracy, and significance. Could this source have known that? Will I need additional information by which to check the accuracy of this information? Does this piece of information confirm or alter the picture as I now see it? Here, as elsewhere, common sense and good judgment are required. No commander can afford to be stampeded into a hasty and ill-considered decision based on unreliable information.

The small-unit leader must finally insure that all information is sent to higher headquarters and interested adjacent units as soon as received. He must also insure that the evaluated and interpreted information—combat intelligence—is passed on to his subordinates rapidly and in time to be of use to them. Information flows up. Combat intelligence flows down. Both flow laterally. And, most important, the flow should be continuous, for only thus can the elements of guesswork and chance be decreased.

Certainly all of this requires training. The company commander must be certain that the 25 members of his command who are specially qualified to secure and handle information of the enemy know their business. He must also insure that there are trained replacements for them within the unit. He must train, not only those whom we may call the company intelligence personnel and liaison agents, but

also the individual soldier. He should see that all his men have some knowledge of the organization of enemy infantry units, and that they are well trained in scouting and patrolling, message writing, map reading, and observing. Without the information that *all* his available sources can get for him, he cannot fight his company with maximum advantage.

Above all, the small-unit leader must rigorously train *himself*. He must be able to decide definitely, and let others know specifically, what information he needs. He must learn how to make a logical plan for the most economical use of all the agencies at his disposal. He must know the capabilities and limitations of each of those agencies. And he must know what to do with the information when he gets it. Only thus can he properly perform his continuing command duty of producing combat intelligence.

CHAPTER 10

On Guard!

The battalion commander addresses his officers

Gentlemen, this is not a critique. It is a planning session.

We have had a measure of success in our recent encounters with the enemy. However, you, as well as I, know that we sustained casualties in men and materiel which could have been considerably reduced if we had been better prepared to meet those inevitable hostile counterattacks.

My battalion staff and I have since figured out, as many of you must also have done, that two things are at fault—lack of prior planning for the *consolidation* of our positions, and failure to effect a rapid *reorganization* with minimum confusion.

Particular attention must be paid to these two points when, in the attack, the going has been rough. Even when enemy resistance has been moderate and there is little probability of a counterattack, and our attack is to continue—even then, the need exists for reorganization of rifle elements and reapplication of supporting fires before shoving off on the next phase of the attack. For failing in the latter, I accept my share of the responsibility. Too much enthusiasm and push at this time can often result in an abortive attack with excessive losses.

The consolidation of a position and the reorganization of units are separate and distinct procedures which usually take place simultaneously. Consolidation of a position means organizing and strengthening a newly captured position so that it can be used against the enemy. Reorganization means replacing casualties, reassigning men if necessary, replenishing the ammunition supply, rendering reports, and so forth.

Every key man has a substitute: Battalion and company executives are charged with taking over in the absence of battalion and company commanders; platoon sergeants substitute for platoon leaders; the assistant automatic riflemen for automatic riflemen; assistant gunners for gunners; and so on. The recognition of seniority and its responsibilities is an old military principle, well understood and usually jealously adhered to. In fact, it is SOP in the Army. Replacement of leaders and key personnel should be automatic and continuous. Throughout the attack no opportunity for partially accomplishing reorganization should be lost.

A successful consolidation of a position requires that certain important exigencies must have been foreseen and planned for. When a fencer has lunged, he immediately resumes the guard to prepare to meet his opponent's riposte or counterattack. After a boxer swings, he immediately recovers his balance and prepares to meet possible counterblows before resuming the attack. After a drive, a tennis player recovers that position in the court from which he can best handle the return ball. These analogies are applicable to this battalion. We have not been very smart in holding the advantage after we struggled so hard to gain it.

Certain SOPs constitute the often neglected but real secret of successful consolidation of a position and final reorganization. They include the full and timely employment of supporting weapons, light and heavy, individual and crew-served.

Later I propose to discuss each supporting weapon separately. Then I shall leave it up to the commanders concerned to perfect the employment of these weapons in the light of each commander's own battle experience and knowledge of his weapons.

You know what the habitual counterattacks by the enemy have done to our companies in the past. Sometimes they came almost immediately; at other times they were delayed. Invariably, the enemy mortars and artillery were adjusted on the objective. Their accurate fire was then followed up by infantry and sometimes by armor.

Often in the past we were exhausted when we arrived on our objective. We were elated, but we did not *follow through*. Instead, we relaxed. When supporting weapons came up, no plan for employing them had been made. As a result, by the time their company and platoon commanders had learned their missions, there was little time remaining to them for reconnaissance and orders. We ended up with poor defensive positions or none at all. In short, we were disorganized: off balance and off guard.

You will remember how we were under almost constant observation by the enemy—how he saw our positions and our weapons, how he had troops nearby rehearsed to counterattack us. You know that we have learned about counterattacks the hard way.

Actually, gentlemen, in the future, it will be inexcusable for any of us not to be consolidation conscious—not only *after* taking the objective but *before*. In warning orders and in attack orders, the word "objective" will mean an area to attack, capture, and *defend*. More than that, somewhere in paragraph 3 of my attack orders I shall issue a tentative defense plan for the objective. Thus, I hope, by our prior planning and extra effort on the objective, to accomplish these things:

1. Achieve an effective hasty defense which will protect our personnel against the enemy's retaliatory fires.

2. Have personnel and weapons in position to repel the counterattack.

3. Have units disposed so as to be able to resume the attack with a minimum of shifting and jockeying.

Of course, I am expecting that the reorganization will be accomplished as a standing operating procedure—commencing automatically at the bottom rather than dictated from the top, and with no delay.

The plan of consolidation of the position will be based partially on the plan of attack, partially on the plan of future advance beyond the objective, and partially on a map study and visual reconnaissance of the terrain. As the British General Fuller says: "In every battle plan, weapons

must be fitted to the ground as well as distributed according to an idea, because the battle is fought on the ground and not in the imagination." And that is where you come in. I shall furnish the tentative plan and I will rely on you to use the terrain of the position to make the plan work. Let everyone in this battalion know what we are trying to do; then let each one strive to do it as the immediate situation dictates. A decentralization of duties is indicated.

Ordinarily, I shall expect each assault company commander, after a successful attack, to establish an outpost on the forward military crest of his company objective or on his portion of the battalion objective. Automatic rifles, submachine guns, and hand and rifle grenades should constitute the principal armament of the outpost troops.

Depending on the pressure of circumstances and, especially, on the terrain, we may act in any one of several ways to effect consolidation of the position and reorganization. They are:

1. Defend the reverse slope, leaving only the outpost on the forward slope.

2. Move forward and defend in the next defiladed area toward the enemy.

3. Dig in for an all-around defense of the position.

4. Displace as many as possible of the rifle troops to the rear or flanks of the captured position so as to take advantage of such cover and concealment as may be available, while at the same time using all *necessary* weapons and personnel to defend the position against enemy counterattack.

This last method certainly seems to favor more careful reorganization as well as a reconstitution of a counterattacking force of our own. However, in any case, supporting weapons will have to be used aggressively.

Measures for appropriate individual protection and the construction of weapon emplacements must be started at once. This means that intrenching tools will be a necessary part of the equipment of the individual in the attack. The intrenching equipment set of the ammunition and pioneer

platoon should be utilized where practicable. To occupy foxholes vacated by the enemy may be risky, as the areas in which they are located are likely to be registered in as targets for hostile mortars or artillery, and the holes may be booby-trapped.

We will use weapons and ammunition left behind by the enemy whenever possible. Keeping ammunition coming up in the attack is always a difficult task, so why should we ignore a windfall? Besides, being shot at with his own weapons will have a certain demoralizing effect on the enemy.

Remembering the definition of consolidation of a position, you will see that supporting weapons must play an all-important role therein. In order that their employment may not be haphazard and ineffective, let us concentrate now on plans for putting those of the battalion into action immediately after the taking of an objective.

ARTILLERY SUPPORT

After a successful attack, I want the forward observer, who arrives on the objective with the assaulting troops, to register his guns on all suspected enemy-occupied areas and dangerous approaches. If the artillery has already prepared such concentrations, it may be necessary only to fire verifying rounds. After that he should order smoke, if he can get it, on probable hostile observation posts in order to screen our reorganization activities. It is gratifying to know that 25 percent of the rank and file of this battalion can adjust artillery fire.

81-MM MORTAR PLATOON

These mortars, usually firing as a battery, provide invaluable support. If their maximum effective range can still reach out in front of the position, I see no reason to displace them right away relatively close to the position. The attacking rifle companies are followed closely by mortar forward observers, who trail wire for sound-powered telephones whenever the situation permits. When this is impracticable they will improvise, until wire can be laid, by

utilizing the battalion radio and telephone nets and relaying the information to the mortars by the most expeditious means. When the objective is taken, the work of these observers just begins. I want the platoon leader to get the firing data for close-in battery primary target areas which I shall point out to him. These he will number and identify to the mortar forward observers. The observers will adjust the base mortar on each of these target areas in order to verify the data. In keeping with the usual technique, additional data will be taken to various reference points. This data, together with that secured by the adjustment just mentioned, will be marked and numbered on a range-card sketch and furnished to the forward observers. Data to engage defiladed places where enemy mortars will be located will be included. The platoon leader will control his mortars from a point near or in communication with me.

HEAVY MACHINE GUNS

I shall indicate to the heavy-weapons company commander where our main line of resistance will be and shall delegate to him the placing of the two machine-gun platoons to take full advantage of the terrain for fields of fire and self-protection. The reconnaissance detail must be on the ball. The heavy-weapons company commander will advise those rifle company commanders concerned of the heavy-weapons fire plan.

ANTITANK GUNS

As it is essential to have antitank protection on the objective at the earliest possible moment, the direction of the most likely tank threat must be estimated in the original planning. The battalion antitank platoon will be emplaced during mopping-up operations. If we have a platoon from the regimental antitank company, it will augment the fires of the battalion antitank platoon. Its squads will provide depth and will be mutually supporting. Since the battalion antitank platoon leader will arrive early on the objective to emplace his guns according to his map plan (which he

verifies on the ground), he will be responsible for the employment of both antitank platoons, but must coordinate with the platoon leader of the attached regimental antitank platoon. He must also make recommendations for the general disposition of bazooka teams and antitank grenadiers in a coordinated plan of antitank defense. Prior to the digging of emplacements, antitank guns will be uncoupled as near to the cover positions as practicable, and will be placed in immediate readiness for action in temporary firing positions. Now, if possible, the artillery, and perhaps the heavy mortars, as well, will put smoke screens on any ground from which the enemy can bring small-arms fire on our position thus enabling the antitank guns to be brought up and disposed to best advantage and with reasonable security. The guns will be placed generally to the flanks of the likely avenues of approach, so as to be able to deliver flanking rather than frontal fire at enemy armor. In order to obtain flanking fire, it will often be necessary for the guns to hold their fire until the enemy tanks reach a predetermined point.

TANKS

Tanks, when attached to or supporting us, will not cruise around on the objective, exposing themselves to enemy antitank-gun and artillery fire. Instead, they will move to defiladed positions from which they can cover all or part of the objective by fire. Thus, they dominate the objective by fire. After the position has been consolidated, the tanks will be ordered to move into a rallying position which I hope to be able to indicate in my original attack order. Here they will reorganize and be available for a mission in our own counterattack plans.

MINES

Full use should be made of enemy mine fields, when they exist in suitable positions, to assist in protecting the consolidation of the position. We could also use some of our own antitank and antipersonnel mines laid hastily. How-

ever, we can seldom expect to have them available quickly enough, since the regiment's initial supply of antitank mines is carried in the transport of the antitank mine platoon. Also, the members of the ammunition and pioneer platoon will be busy at this time hand-carrying ammunition to the company areas.

CANNON PLATOON

In the consolidation of the position, emphasis should be placed on the greatest possible speed in organizing fires to hold effectively the objective gained. I expect cannon observers to check with the mortar observers to learn where concentrations are needed in front of the main line of resistance. Next, concentrations must be planned to cover enemy observation posts and points likely to be occupied by his supporting weapons when he launches his coordinated counterattack. Indirect fire is what we shall need, so communication must be established quickly between OPs and the firing position area. The latter will be in deep defilade in order to secure flexibility and security. The sections will use camouflage nets and will dig in if time permits.

ADMINISTRATIVE REORGANIZATION

There are other details which we must keep in mind. There must be reports of information concerning the enemy, of our casualties and of our ammunition requirements. Wounded men must be taken care of, and prisoners evacuated.

I shall specify in the original attack order how much ammunition will be placed on the position. Use of transportation for this purpose must be economical. Ammunition-train vehicles will not advance beyond the battalion ammunition supply point. Weapon carriers and hand-carry will have to be relied on. Availability of defilade and concealment and the probable future use of vehicles are factors to be considered in determining which vehicles are to be left in the forward area.

I want rations and water to get necessary attention from our S-4. A bracer in the form of hot coffee may be possible in some instances.

General Montgomery has said: "When we are fighting a battle we must always be so balanced or so poised in the whole area of operations that we are able to pursue our plans ruthlessly and never have to react to anything the enemy may do." The General was talking about an army, not a battalion. Nevertheless, there is a lesson for us in his words. Of course this battalion must react when the enemy counterattacks us. But our reaction should be automatic—the smooth operation of previously prepared plans, not the convulsive results of hasty improvisation. Enemy counterattacks must not keep us from pursuit of our plans, because our plans must anticipate and provide for the repulse of those counterattacks. That is what I mean by being on guard after we have successfully attacked the enemy.

CHAPTER 11

Principles of Town and Village Fighting

The attack and capture of a village usually requires a considerable amount of time. The cover and concealment enjoyed by the defenders of a built-up area enable even a greatly inferior force to resist anything less than a co-ordinated attack. Whenever possible, therefore, leading elements in an advance should by-pass villages, isolate them, and leave them for supporting or reserve units (or specially equipped units) to deal with. Specially equipped units may have flame throwers, bangalore torpedoes and other demolition charges, smoke grenades, or other equipment particularly adapted for use against fortified buildings and emplacements. When a village is being by-passed, the occupying enemy must be blinded by smoke and pinned down, chiefly by artillery and mortar fire.

When, then, should a village be attacked by leading elements? The answer is that it should be attacked when to by-pass it will endanger the advancing troops or imperil the plan of the higher commander. The enemy will strongly defend towns or villages which are strategically located and which he believes cannot be by-passed. When specially equipped combat units are not available, these villages must be captured by rifle troops with their organic and supporting weapons. It is with this sort of situation that the present discussion is concerned.

Following are a number of general principles which are a reliable guide to successful offensive combat in towns and villages. The soundness of these principles has been demonstrated by the Russians, who have had longer experience in this type of fighting than the other United Nations, as well as by our own and British forces in Italy and France.

PRINCIPLE NO. 1. *Fighting in streets is avoided.* In advancing through a village, streets are used only when absolutely necessary. Admittedly, movement along streets is comparatively rapid, but it also provides better targets for snipers and machine gunners. Back yards, courtyards, gardens, roof tops, and routes through buildings are used whenever possible, even though control may be difficult.

PRINCIPLE NO. 2. *Units are divided into small teams capable of independent action.* Once the fight starts, control by higher commanders is practically nonexistent. Units as small as squads or even half squads will operate independently and under the command of their own leaders. These conditions are imposed by the difficulty of communication while the fight is going on among the buildings.

PRINCIPLE NO. 3. *Objectives are not only definite, but also limited.* This means that the frontages of all attacking units are narrow. It means that the village is attacked systematically, section by section. Adherence to this principle helps eliminate the possibility of overlooking groups of defenders and leaving hostile centers of resistance in the rear. Also, the narrow front makes it possible to maintain liaison in depth by passing information back from group to group. An example of a limited and definite objective for one platoon is the clearing of the buildings facing a single street. One squad might take the buildings on one side of the street; a second squad might take those on the other side; the third squad might be held in support. It is essential that commanders keep well up with their troops.

PRINCIPLE NO. 4. *Every movement has covering fire.* This principle is so important that it is discussed in detail subsequently in this chapter.

PRINCIPLE NO. 5. *Support squads and platoons follow close behind leading groups.* This is necessary because the supports may be called upon with little warning. It saves time in getting the supporting unit into action. It also enables the commander of the supporting unit to keep personally abreast of the situation and thus be better prepared to use his troops effectively when committed. Finally, immediate occupation by supporting units of buildings which

have been cleared by the attacking echelon prevents the enemy from infiltrating back into these buildings. Although pockets of resistance are seldom by-passed by the attacking echelon, the supports are prepared for mopping-up operations when necessary.

PRINCIPLE NO. 6. *Plans and instructions are clear and simple.* Complicated maneuvers, such as one involving a change of direction, are avoided. Subordinate leaders and individuals must understand their missions so thoroughly that movement can be accomplished rapidly in proximity to the enemy without additional orders.

PRINCIPLE NO. 7. *Action is swift and aggressive, and designed to achieve surprise.* The earlier the enemy receives warning of an attack, the more strongly he will defend his positions. Speed must not slacken for an instant. Even a weak plan carried out aggressively has a better chance of succeeding than a good plan executed hesitantly. The attacker starts at a disadvantage which he can overcome only by giving the defender no time to prepare, no rest in retreat, no opportunity to reorganize. Momentum must be maintained. The motto is: Hit first, hit hard, and keep hitting!

PRINCIPLE NO. 8. *The plan of attack is based on accurate and complete information.* The layout of the town (village) must be known. The most heavily garrisoned sections should be identified, and the strong points located. Often it is more difficult to spot these strong points than to reduce them after they have been discovered. In a village, surprise fire is particularly deadly because it is at close range. If the attacker is not thoroughly acquainted with the geography of the place, disastrous surprise may await him at any turn. On the other hand, given a complete knowledge of the locality, it is usually possible to foresee where the enemy will locate his automatic weapons, thereby avoiding coming under their fire unexpectedly, and making it possible to get around his strong points and attack them from unexpected directions.

What are the best sources of information about enemy-held villages? They are aerial photographs, maps and travel folders, friendly civilians, prisoners, normal intelligence channels, and—most important of all—personal reconnaissance or reconnaissance by scouting or raiding parties. The accuracy of any information obtained from a civilian must be suspected, and an attempt made to verify it by compelling him to take part in some operation prompted by it. For example, if a civilian states that a certain culvert provides a covered route across a street, but refuses to lead the attackers through it, it is fairly certain that he is working for the enemy and that the culvert is booby-trapped or covered by enemy fire. The next step is to confine him so that he can volunteer no more misinformation. This method of verification is not infallible, but it is extremely useful.

THE PLAN OF ATTACK

Two further principles are followed in planning the attack:

1. Even if the objective has been surrounded prior to the attack, it may be advantageous to conceal this fact from the enemy. If he believes that retreat is possible, he may, at some stage of the battle, attempt to withdraw. He will then be cut down by a force outside the built-up area whose mission it is to control the enemy line of retreat and communication.

2. The first object of the attack is to divide the enemy. Assault groups isolate the defenders in as many separate pockets as possible, denying them freedom of movement. Groups of fortified buildings constituting strong points are then reduced successively.

The plans of attack which may be adopted are fundamentally similar to those which may be used in an ordinary combat situation, except that attacks in more than one direction, as from the front and a flank simultaneously, are avoided. They add to the confusion which is unavoidable in village fighting and may result in friendly troops firing on one another. One of the most effective methods is to

launch either a frontal or a flanking attack and at the same time send a force around to the rear of the town to take the enemy under fire as he retreats. The British call the enveloping force a "seal"—a term which is a trifle misleading, as its mission is not to seal the enemy within the town but to annihilate his forces once he has withdrawn from his covered positions inside the town.

The details of the plan adopted in a particular operation depend upon many different factors.

1. The nature of the terrain around the town dictates the routes of approach. If part of the town is on high ground and part on low ground, the highest portions are attacked first.

2. The construction of the buildings within the town is an important consideration because the reduction of reinforced concrete or stone structures presents difficulties not encountered in attacking wooden buildings.

3. The location of the public utilities influences the plan. If the attacker wishes subsequently to use the town, his plan includes seizure of the power plant, radio station, telephone exchange, gas works, water supply installations, and fire station early in the attack, to prevent their destruction by the defenders. Otherwise, he attempts to destroy these facilities immediately, in order to make the task of the defense more difficult.

4. The disposition, strength, and attitude of the enemy fundamentally affect the plan. Rarely is he present in sufficient force to garrison every building, and seldom is it to his advantage to do so even when he has the means. It must be determined, therefore, which buildings he occupies and in what strength, and whether he intends to conduct a last-ditch defense of each strong point, or merely a delaying action.

5. Weather is a determining factor. Fog, heavy rain, or snow hampers enemy observation and provides the attacking forces with some concealment.

6. The time available prior to the launching of the attack is a factor in planning, because reconnaissance is continued as long as that time permits.

7. The attitude of civilians in or near the town may influence many details of the attack. Friendly civilians can give the attackers valuable assistance. Civilians whose sympathies are doubtful are considered as enemies and treated accordingly. The enemy seldom permits civilians hostile to him to remain at large, if he can help it.

8. The degree of training and experience of the attacking troops may affect the plan.

Prior to the attack, definite arrangements are made for maintaining coordination between all units. There must be coordination within the ranks of the forward rifle troops and equally close coordination between these forward troops and the weapons delivering supporting fires.

This preliminary planning for coordination is even more important in town and village fighting than in most combat situations. During fighting in and among buildings, control is so difficult that only clear-cut prearranged plans prevent chaos. Furthermore, the attacker's automatic weapons are sited to place grazing fire in so-called killing zones along streets, alleys, and open areas, to isolate sections of the village and prevent escape or reinforcement of the enemy in those sections. Advancing rifle troops cannot cross a killing zone until the fire has been lifted. Prearranged signals to lift killing-zone fire prevent long delays at these points and help to keep the attack moving rapidly.

There are six principal methods of establishing coordination:

1. By designated intermediate objectives or phase lines at which each unit reorganizes briefly and awaits further orders. A phase line may be a cross street, a canal, a ditch, an alley, the near edge of a park or other open space—in fact, almost any easily designated and recognized landmark.

2. By wire communication.

3. By visual signals.

4. By radio. (Radio is often unreliable in areas containing buildings with steel framework.)

5. By messenger.

6. By time schedule.

As many as possible of these methods should be used, to insure that failure of one of them will not result in failure of the attack.

USE OF WEAPONS

Rifle units attacking a town or village employ their organic weapons much as they do in a normal combat situation, except that fields of fire are greatly restricted. Following are a few observations on use of weapons:

1. The M1 rifle, inside buildings or at close quarters elsewhere, is usually fired from the hip. This facilitates rapid fire at surprise targets and is a sufficiently accurate method at short ranges.

2. In house searching, grenades and rifles are the preeminent weapons. Use of the bayonet is undesirable because of the danger of accidental injury while climbing and crawling; because of its unwieldiness among furniture and barricades; because it increases the difficulty of concealment while firing from loopholes or windows; and because bayoneting an enemy is less conducive to rapid movement than shooting him. The bayonet is always carried, however, and may be fixed at the discretion of the unit leader or of the individual when circumstances are favorable to its employment. Such circumstances might occur in the case of a patrol or a supporting unit moving through a village in which mopping up is not complete.

3. The automatic rifle is not used in the manner of a submachine gun (see below) when searching a building. It is too heavy and clumsy. Its potentialities are better realized by keeping it in a firing position with a covering party, either in a previously captured building or at some other point where a good field of fire exists. The general rule is: Do not take the automatic rifle into a building until the building has been completely cleared of enemy; even then, take it in only to obtain a better field of fire.

4. The hand grenade is particularly valuable. If possible, every man should have an extra supply. Every entrance into a building or a room not previously searched is prepared by throwing one or two grenades ahead of

the searchers. Within the confines of a room, the offensive grenade is sometimes more effective than the fragmentation grenade, because of its greater stunning power.

5. The submachine gun, six of which are now allotted to the rifle company, is an ideal weapon at close quarters where a large volume of fire is more essential than great accuracy.

6. Rockets and rifle grenades are used against barricades, sandbagged emplacements, and emplacements behind the walls of buildings, as well as against armored vehicles.

7. The light machine gun and the 60-mm mortar may be used in the same manner as the heavy machine gun and 81-mm mortar, the employment of which is discussed in another part of this chapter. The 60-mm mortar may also be attached to rifle platoons for use as a weapon of opportunity against enemy on roof tops or behind barricades without overhead cover.

COVERING FIRE

To attack without covering fire is suicidal (general principle No. 4: Every movement has covering fire). Several types of fire are ordinarily used: high-angle fire by howitzers and mortars; direct fire by antitank guns and sometimes by howitzers as well; machine-gun fire laid down in killing zones; small-arms fire at specific targets such as windows and doorways, by rifles, automatic rifles, and, in some cases, machine guns.

Figure 52 illustrates an organization of the rifle squad useful in securing proper covering fire within the squad. This organization is recommended as SOP for units when engaged in house-to-house fighting. The three-man automatic rifle team is always a part of the covering party. The two four-man groups are called assault teams. In attacking a series of buildings, if assault team No. 1 forms the searching party for the first building, team No. 2 operates with the automatic rifle team as the covering party. When the next building is attacked, No. 2 is the searching party, and No. 1 helps provide covering fire. The teams alternate

jobs in this manner from building to building, thus dividing equally the most difficult work of the squad. The squad leader usually brings up the rear of the searching party, in a position such that he can readily signal back to the covering party, replace casualties, and otherwise control the squad.

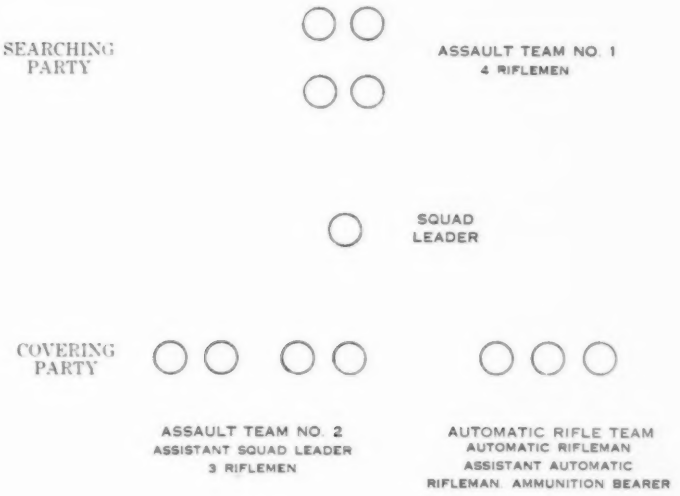

FIGURE 52.—Suggested organization of a rifle squad for house-to-house fighting.

The four members of each assault team are paired in two buddy teams. The guiding principle of this buddy system is *not* "Buddy, you go first." It is constant teamwork, in which each protects the other. When one man enters a door or window or searches a room, the other covers him. The buddy system is used by U. S. Rangers and British Commandos, who have not only buddy riflemen but also buddy squads, buddy platoons, and even buddy companies. Buddies train together to the point where they know each other's capabilities and limitations thoroughly under all circumstances.

The covering party protects and facilitates the advance of the searching party toward the building under attack by firing not only at that building but also at all other points from which enemy fire may endanger the searching party. More than four men in a searching party merely get in one another's way. If a building is so large that it cannot be captured by four men, the searching party is not enlarged; instead, the task is divided among two or more squads, each assigned a specific portion of the building.

Covering fire within the squad or platoon is assured by other methods, varying with the route of advance. In selecting the line of advance, care is exercised to avoid (1) masking the covering fire and (2) delaying while in the open.

As has been pointed out, routes of advance through back yards, gardens, or buildings, or over roof tops are preferred. When it is absolutely necessary to advance along a thoroughfare, troops move in single file on either side of the street, maintaining intervals of several yards between men, keeping close to the walls, alert for whatever cover is available. Each file watches the windows and doorways of the houses on the opposite side of the street. Designated men watch basement windows for snipers, others first floor windows, others upper floor windows, and still others the roofs. When movement on the roofs of adjoining buildings is possible, detachments selected for agility and marksmanship may advance across the roofs on either side of the street, on the lookout for snipers in the buildings opposite and covering the movement of the rest of the troops in the street. Upon reaching a cross street, the roof detachment covers the advance from roofs or windows on the near side of the street before rejoining its unit. Meantime, a new roof detachment is sent out on the far side of the cross street.

The enemy is sure to occupy a building having windows which dominate a whole street — for example, a house at the end of a street or on rising ground farther away. If such a dominant building exists, it is destroyed or blinded before the street is attacked. Conversely, from a commanding building near the end of the street at which the

attack commences, an automatic rifle or light machine gun can give effective supporting fire for some distance down the street.

HOUSE-TO-HOUSE FIGHTING

Fast, smooth teamwork is required of a unit fighting from house to house. In the case of a rifle platoon engaged in clearing the buildings facing a single street, one rifle squad leads the advance along either side. Each of these squads is broken down, in the manner previously described, into a searching party and a covering party. In order that each searching party may have covering fire not only from the covering party of its own squad, but also from the entire squad on the other side of the street, the squads do not attack simultaneously. Instead, they make their assaults alternately, so that the platoon's advance is first through a building on one side of the street, then through one on the other side, the two leading squads always remaining approximately opposite each other. When a searching party has cleared the enemy from a building, it takes positions to cover the advance of the squad working the other side of the street and gives an all-clear signal to that squad and to the covering party from its own squad. Usually a shouted signal, perhaps a code word, is sufficient.

HOUSE SEARCHING

The searching party, approaching a building to enter and search it, advances (1) rapidly, (2) without masking the covering fire, (3) under such cover and concealment as are available, and (4) in dispersed formation. If possible, the searching party enters the building from the roof or by an upper-story window, and searches downward. This has three advantages:

1. Grenades are more easily thrown down than up.
2. The enemy is forced downstairs into poorer firing positions.
3. When driven to ground level, the enemy may be tempted to retreat into the open, where the covering fire will annihilate him.

If entry is possible only at ground level, the searching party approaches a door or window from the side, hugging the wall. If the door is locked, the lock is shot off, and a round or two fired through the wall to left and right of the door before it is opened. A grenade is always thrown through any door or window before entering. The first man enters as soon as the grenade explodes and stands with his back against the near wall, covering the entrance from the inside, while the remainder of the party enters. Once inside, they head for the top floor, if possible. The first man on a stairway takes three or four steps at a time. When his buddies follow, they use the same steps, to minimize the danger from booby traps.

Whether the start is on an upper or a lower floor, each building is searched room by room, floor by floor. The roof and the cellar must not be overlooked. Closets, alcoves, hangings, piled furniture, and debris are searched thoroughly. To leave an enemy in the rear is dangerous and, if he attacks without warning, can have demoralizing results.

If a door is barricaded, an entrenching tool, ax, or explosive charge is used to make an opening, called a "mousehole," just large enough for the passage of a man, through the wall near the floor. As soon as the hole is made, a grenade is thrown through it, and the searchers follow immediately. The "mousehole" technique is also used, whenever possible, to enter an adjoining building in preference to dashing across an open space. The attacker is constantly alert for "mouseholes" previously made by the enemy and concealed in closets, behind pictures, under furniture or rugs, by means of which he may reach the attacker's rear.

Generally speaking, the enemy does not booby-trap buildings which he is occupying. However, this cannot be taken for granted. Doors and windows may be booby-trapped. A building may be filled with mines and booby traps all activated by a master switch, to be closed by the last defender as he retreats from the position.

REMINDERS

The rifle is fired, whether from the shoulder or the hip, right-handed when taking cover against a wall to the left. It is fired left-handed when the wall is to the right. This technique exposes a minimum of the firer's body to an enemy around a corner ahead of him.

The muzzle of the rifle is not allowed to project through a window or doorway. Riflemen keep away from such openings as far as possible, in order to avoid disclosing their location to the enemy and drawing fire.

Men must learn to throw a grenade accurately a short distance with either hand. A left-handed toss often facilitates the thrower's keeping under cover.

Before he throws a grenade, the thrower must know exactly where he is going to take cover from the explosion. This is especially important when aiming through a window or other restricted opening. If the aim is faulty, or the enemy has screened the opening and the grenade bounces back, the grenadier must be able to get around a corner or behind a barricade before the explosion.

SUPPORTING WEAPONS

Weapons supporting an attack on a town or village have restricted fields of fire. Many of their targets (buildings) are specifically designated in advance, and they have, for this reason, correspondingly few targets of opportunity. All their fires are very closely coordinated with the advance of the assault troops from building to building and street to street.

ARTILLERY. Field artillery and infantry howitzers deliver both direct and indirect fire in preparatory or softening-up concentrations and against pillboxes, fortified buildings (especially large buildings), road blocks or barricades, avenues of exit, and concentrations of personnel. The artillery also delivers smoke.

ANTITANK GUNS. Since tanks are seldom a part of the defense of a village or town, antitank guns are used

chiefly against automatic weapons emplaced behind concrete or brick walls, pillboxes, and sandbagged emplacements. Antitank guns are frequently attached to rifle units.

MORTARS. Mortars deliver neutralizing fire against concentrated enemy personnel, definitely located automatic weapons, and, especially, roof-top targets. They also deliver smoke. The 81-mm HE shell does not destroy strongly constructed buildings but will penetrate most roofs. Mortar targets can be designated with exactness because individual buildings are easily described and recognized. Since smoke shells have incendiary action, the desirability of placing smoke on an area containing wooden buildings must be carefully weighed. Destruction of buildings by burning will ordinarily aid the attack. However, if the attacker plans to occupy the town indefinitely or operate important installations in it, excessive destruction will defeat his purpose.

MACHINE GUNS. Machine guns interdict avenues of movement by establishing killing zones along them, thus isolating areas under attack, preventing reinforcement, denying access to alternate and supplementary positions, and destroying defenders who are driven out of buildings and emplacements. The enemy may barricade some streets heavily, preventing the establishment of killing zones. It is sometimes possible to destroy such barricades by direct artillery fire. When this is not possible, the machine-gun missions are neutralization of firing positions inside doorways, windows, and loopholes. The guns may advance by bounds behind the assault units, or may be attached to them. Similar neutralization missions are normal to cover the entry of assault teams into blocks or buildings.

TANKS. In a built-up area, tanks are unable to make full use of their mobility, while their vulnerability to close-in attack by light antitank weapons is emphasized. As a result, they are seldom employed in close support of an attack on a village or town. Under special circumstances, however, they may render valuable support as mobile artillery, and may also be used to assist in the reduction of pillboxes or well-protected snipers' positions.

ILLUSTRATIVE PROBLEM

The sketch in Figure 53 shows a rifle company's scheme of attack of a small village. This village cannot be by-passed. Its buildings are of stone and masonry.

Company A has been advancing northward and is halted south of MONTVILLE ROAD. HILL X has been captured by Company B. West of the village, friendly troops have advanced about 500 yards north of MONTVILLE ROAD. Company A's mission is to seize the high ground (not shown in figure) 300 yards north of the village. The village is divided roughly into northern and southern halves by the open area midway between 1ST and 2D AVENUES and is dominated by the three two-story buildings represented in Figure 53 by shaded symbols.

In close support of the company are: one section of 81-mm mortars, one platoon of 105-mm infantry howitzers, two squads of 57-mm antitank guns, and one platoon of caliber .30 machine guns.

Captain Company A orders his 1st Platoon, with the 1st 60-mm Mortar Squad attached, to attack parallel to and west of ORIENT ROAD.

The 2d Platoon to attack parallel to and east of ORIENT ROAD.

The 3d Platoon, less the 1st Squad, to assemble in support and move north under cover west of the village, to protect the left flank of the company.

The 1st Squad, 3d Platoon, to follow the 1st and 2d Platoons and perform any necessary mopping up.

The Light Machine Gun Section to advance simultaneously with the 1st Platoon and establish successive killing zones in front of the platoon from positions west of SWAMP STREET.

The 60-mm Mortar Section, less the 1st Squad, from positions south of MONTVILLE ROAD, employing an observer with each assault platoon, to fire on open areas between buildings in the southern half of the village until the attack is launched, then to deliver similar fires in the northern half of the village.

From H minus five minutes until H minus two minutes, the 81-mm Mortar Section, from positions near the edge of the woods southwest of the MONTVILLE-ORIENT road junction, will place a heavy concentration of HE on the southern half of the village. This will temporarily force the defenders away from their firing positions in doorways and windows and on roof tops and will cover the occupation of initial firing positions by the machine-gun and antitank squads (see below). At H minus two minutes, the mortars will place smoke on the northern half of the village to blind observation and fire from that area as the assault on the southern half of the village commences. At H hour, they will change from smoke to HE. Mortar observers will go forward with the rifle troops.

At H minus five minutes, the cannon platoon will commence firing from positions south of MONTVILLE ROAD to destroy the two two-story buildings in the southern half of the village or at least to render them useless as observation posts and elevated firing positions. At H hour, the cannon platoon will shift fire to the single two-story building in the northern half of the village. Howitzer observers will advance with the assault units. The cannon platoon will be prepared to displace to positions from which it can deliver fires to the north of the village.

At H minus four minutes, the 1st Antitank Squad, from a position west of SWAMP STREET and south of the village, will take under fire buildings on the south side of 1ST AVENUE which show signs of enemy occupation. At H hour, it will shift to the buildings west of SWAMP STREET. When its fire is masked by friendly troops, it will displace to the vicinity of the latter buildings and fire at targets on 2D AVENUE.

At H minus four minutes, the 2d Antitank Squad, from a position just northeast of the MONTVILLE-ORIENT road junction, will open fire to destroy the nearest building on the east side of ORIENT ROAD. Thereafter, it will fire at targets of opportunity in the southern half of the village.

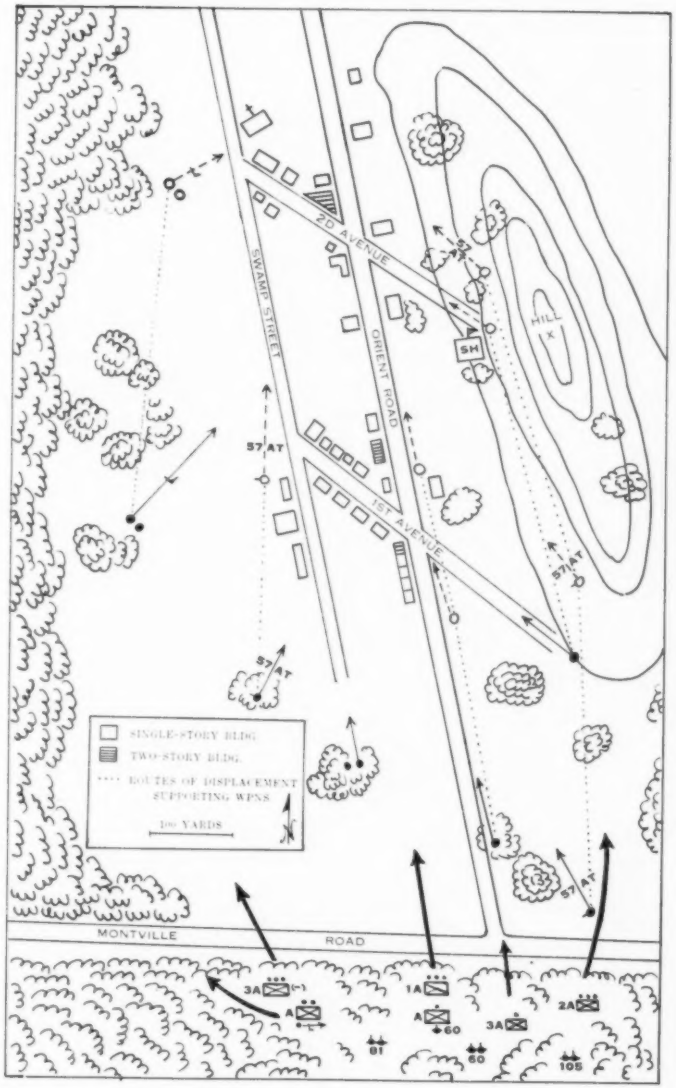
20 AVENUE
SWAMP STREET
ORIENT ROAD
1ST AVENUE
HILL
X
SM
57 AT
SINGLE-STORY BLDG.
TWO-STORY BLDG.
ROUTES OF DISPLACEMENT SUPPORTING WPNS.
100 YARDS
MONTVILLE
ROAD
3A
A
1A
A
60
3A
2A
81
60
105

FIGURE 53.

When its fire is masked, it will displace successively to positions east of 1ST and 2D AVENUES, continuing to support the advance of the 2d Platoon.

When the village has been captured, both antitank squads will take positions in the north end of the village, prepared to resist mechanized counterattack.

At H minus four minutes, the 1st Section, Machine Gun Platoon, from positions south of the village in prolongation of SWAMP STREET, will deliver neutralizing fire against windows and doorways of the buildings west of SWAMP STREET and those on the south side of 1ST AVENUE. When its fire is masked, this section will establish a killing zone along SWAMP STREET.

At H minus four minutes, the 1st Squad, 2d Machine Gun Section, from a position just east of ORIENT ROAD and north of the MONTVILLE-ORIENT road junction, will open fire at targets of opportunity in the southern part of the village. When its fire is masked, it will displace northward along ORIENT ROAD to a position south of 1ST AVENUE, and continue to support the assault. It will cover the displacement of the 2d Squad, 2d Machine Gun Section, and will displace farther northward along ORIENT ROAD as necessary.

The 2d Squad, 2d Machine Gun Section, from a position in prolongation of 1ST AVENUE, will fire the same initial mission as the 1st Squad. When its fire is masked, it will establish a killing zone along 1ST AVENUE. Upon the capture of the southern half of the village, it will displace to a position near the schoolhouse and will establish a killing zone along 2D AVENUE.

All machine guns will displace, when the village has been captured, to positions north of the village, particularly on the western slopes of HILL X, prepared to engage any enemy counterattack.

CHAPTER 12

Briefing With a G. I. Blanket

Models in relief of terrain over which troops are to operate such as those used for the invasion of Sicily and currently in attacks in the Pacific, are obviously of so high a value as to need no sales talk. Their use is in line with recognized modern procedure, and will beyond a doubt be expanded tremendously in the future. Often they have been and will be scaled as low as 1:5,000, thus enabling the lowest units and individual personnel to get a good preview of the terrain over which they are about to operate.

Such models, however, cannot be expected to go beyond a certain point, and frequently will not be up to date, particularly as regards military installations. This is where the G. I. blanket comes in.

Practically any kind of ground, together with natural and artificial features, can be reproduced with sufficient accuracy by any properly trained member of an S-3 or G-3 section by the use of a G. I. blanket and the simplest auxiliary materials. If the necessary data has been secured, it can be reproduced in most cases within half an hour, and at locations almost up to the very front line. Commanders and troops can be briefed successively as to the terrain over which they will operate and the method of their operation. The simplicity of this training aid, its constant and immediate availability, together with its accuracy and graphic quality, demand that it be seriously considered for general adoption.

FIGURE 54.

The figure accompanying illustrates the terrain represented in Figure 9 ①, paragraph 143, page 119, FM 7-20, The Infantry Battalion, dated 1 October 1944. The terrain itself consists of the blanket (one-inch sandbags may also be used for smaller areas) ; hills are made by lumping up newspaper or any other handy material in the proper shapes and at the proper places. Woods are represented by moss or collections of the ends of shrubbery. The line of departure is a shelter-tent guy rope. Roads are pieces of engineer tape. The boundary of the battalion reserve is a piece of marline.

Designations of units, objectives, and target areas are drawn on small pieces of trimmed paper which can be placed at will. An accumulation of such conventional signs and notations will obviate the necessity for their being drawn anew on each occasion. Everything except the engineer tape and marline is available to any unit; these two items are obtainable in the battalion headquarters company and can easily be spared for the purpose indicated.

CHAPTER 13

The Battalion Medical Service

The functioning of the medical units which support the infantry in combat is a matter of importance to all infantrymen. The infantryman should understand the relationship of the various components of the regimental medical detachment to each other and to supporting medical units farther to the rear. He should also understand the influence of the tactical situation of the supported infantry upon the operations of the supporting medical troops.

The two-part demonstration described here has been presented at The Infantry School as an aid to the understanding of these points. Specifically, its purpose is to show the employment of the medical section of an infantry battalion in an offensive situation.

Scene I

Functions of Company Aid Men and Litter Bearers

INSTRUCTOR:

Follow me on your sketches *(see fig. 55)*. The 3d Battalion has been fighting since daylight. It has captured HILL 15, to our right rear (*pointing*), and has driven an enemy force northward to the positions shown on the sketch. The attack has been stopped along this ridge on which you are located. You are on the line of departure, and approximately in the center of the battalion zone.

Notice that the enemy position on RIDGE 23 (*pointing*) affords good observation and fields of fire across this open ground to our front. However, on the left of the zone there is cover and concealment which might facilitate an advance which would eventually envelop RIDGE 23 and HILL 24 (*pointing*) from the west.

During the capture of HILL 15, Company K, the left attacking company, was badly shot up. Company L, the right attacking company, did not suffer so heavily. Company I, which has been in reserve, is now moving into position to make an envelopment of RIDGE 23 and HILL 24 from the woods in the west portion of the zone.

The reasons why this attack has been stopped are of interest to the medical service. You know that the infantry must have superiority of fire in order to advance against the enemy and close with him. But, as an attack progresses, the supporting fires tend to become disorganized; communications and, hence, control tend to be disrupted. Eventually, in certain areas, the defenders gain fire superiority, thereby stopping the advance.

Now why is the medical service interested in this? Because casualties, which are the concern of the medical service, are not uniformly distributed in an attack. There are always certain "areas of casualty density." And an area in which infantry is stopped because the enemy has gained fire superiority is almost always an area of casualty density. Areas of casualty density are created also when troops are caught in artillery concentrations, or by final protective fires. The medical service attempts to predict the occurrence of these areas of casualty density and to dispose the medical troops in the most advantageous positions to serve them.

At this point the attack is resumed. In Company L's zone, rifle troops are seen advancing by short rushes. In rear of the class, a section of heavy machine guns commences to fire in support of the attack. Demolition charges, simulating artillery and mortar fire, are detonated in the vicinity of RIDGE 23. There is some rifle fire and an occasional burst from a machine gun from the enemy position on RIDGE 23. Firing is heard also from the woods to the left front.

INSTRUCTOR:

The battalion has been reorganizing. Its supporting weapons have been displaced forward, and a new fire plan

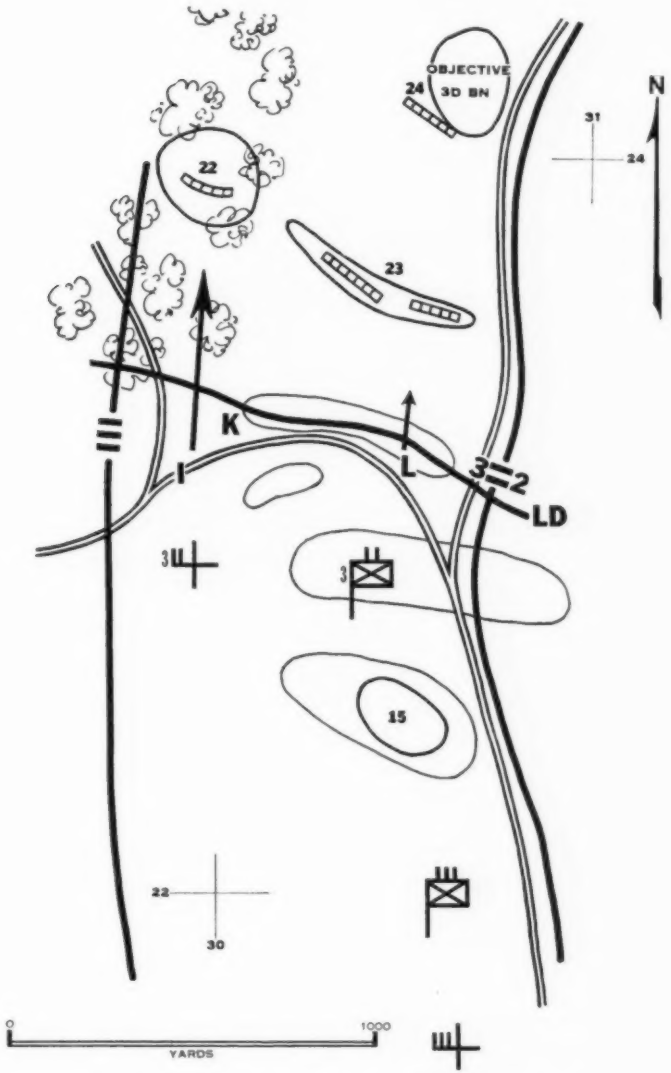

FIGURE 55.—Situation sketch for demonstration of battalion medical section in attack.

has been prepared. Communication and control have been reestablished. The attack is now resumed. Company I is attacking HILL 22 (*pointing*) and will envelop RIDGE 23 and HILL 24 from the west. The supporting fires coming down on RIDGE 23 have made it possible for Company L to advance frontally. Company K is to become the new battalion reserve.

Notice that Company L is obviously not at full strength. Remember that it has been fighting for some time and has already taken one objective today. In combat a rifle company does not stay at full strength very long. You may have heard that casualties may average 10 percent for a day of combat. Do not be misled by this. It is a figure which may apply to a large number of regiments in an extended period of fighting, but it is not realistic for small units. Casualties actually are concentrated, as has already been pointed out, in certain areas of combat. Therefore they are necessarily concentrated also in certain units, usually rifle companies. During combat, the supporting medical troops must be allotted, and often redistributed, to those units which are sustaining a high proportionate share of the casualties.

As the demonstration troops move forward in the attack, certain previously designated men become casualties. One of them falls a short distance in front of the class. About half of the simulated casualties are walking wounded.

INSTRUCTOR:

In spite of the fire which is being placed on the enemy, Company L is sustaining some casualties. Notice those two men, wearing white brassards with a red cross, who are going to the assistance of the wounded. They are from the company aid squad of the medical section of the 3d Battalion. These company aid men are right up with the rifle platoons under fire, and, as you can see, they even have to move in short rushes from cover to cover in order to reach the injured men.

Normally there are three company aid men per rifle and heavy-weapons company. Their function is to give first aid by controlling dangerous bleeding, by hasty dressing of

wounds, and by splinting fractures. They move the wounded, whenever possible, to protected positions. They also send back information to the battalion surgeon, by litter bearers or by walking wounded, on the location of the company and the number and location of casualties.

Enemy are seen withdrawing northward from RIDGE 23, and Company K captures the position in an assault from the woods to the west. The machine-gun section supporting Company L's attack displaces forward by hand. A litter team appears, picks up the casualty in front of the class, and moves off to the left rear.

INSTRUCTOR:

Litter teams cannot operate, in daylight, in an area in which the enemy can deliver aimed small-arms fire, because they must stand upright while working and must move slowly. Therefore, they have to wait until, as in the present case, the enemy can no longer fire into a terrain compartment. Thus, they usually work behind the first terrain feature in rear of the attacking echelon. They apply emergency treatment to any wounded who may have been overlooked by the company aid men. They also serve as guides for walking wounded and as communication agents between the company aid men and the battalion aid station. It is worth noting that they do not move fracture cases until the fractures have been splinted. Since neither aid men nor litter bearers can conveniently carry splints with them, they improvise splints from sticks, rifles, bayonets, or any other suitable material which is available. You will see later that, at the aid station, improvised splints are replaced by prepared splints from splint sets.

This concludes the demonstration of the combat functions of the company aid men and the litter bearers of a battalion medical section. We will now go to the battalion aid station and see how that medical installation operates in caring for the wounded.

Scene II

The Battalion Aid Station

INSTRUCTOR:

This is the aid station of the 3d Battalion. Before we examine the activity here, let us have a look at the organization of the regimental medical detachment, of which the battalion section is a part.

The detachment is an integral part of the infantry regiment. It is composed of 10 officers and 126 enlisted men. Five of the officers are medical officers; 3 are medical administrative officers; 2 are dental officers. The ranking officer, a major, is the regimental surgeon and commands the detachment. He is a member of the special staff of the regimental commander and advises him on all medical matters.

When the regiment is camped or bivouacked as a unit, the medical detachment holds sick call for the regiment and makes inspections of sanitary conditions, the results of which are communicated to the regimental commander in the form of recommendations by the regimental surgeon. On the march and in combat, the detachment is divided into a headquarters section and three identical battalion sections, one normally being attached to each battalion of the regiment. The proper functioning of an attached medical section is as much the responsibility of the battalion commander as is the functioning of one of his rifle companies.

The headquarters section is composed of 4 officers and 30 men. They do the administrative work of the detachment and operate the regimental aid station, usually located fairly close to the regimental command post. This aid station cares for casualties which occur in and around the command post and for casualties in the separate companies of the regiment —the headquarters company, service company, antitank company, and cannon company, except such elements as may be functioning with battalions. The officers are the regimental surgeon, 2 dental officers, and a general-duty medical officer. The enlisted men include 8 company aid

men, usually allotted on the basis of 3 to the antitank company, 3 to the cannon company, 1 to the headquarters company, and 1 to the service company.

Each battalion section is composed of 2 medical officers and 32 enlisted men. The officers are the battalion surgeon and a medical administrative officer. The 32 men are assigned 12 to the company aid squad, 12 to the litter-bearer squad, and 8 to the aid-station squad. The company aid squad ordinarily sends one man to each rifle platoon and one to each platoon of the heavy-weapons company. The litter-bearer squad is organized into 3- and 4-man teams or 6 2-man teams, depending on the length of the carry required. In a few minutes you will see how the members of the aid-station squad perform their duties.

This aid station is displacing forward by bounds as the attack of the battalion progresses. The aid station has just moved into this area in preparation for the renewal of the attack which you witnessed in the first part of this demonstration. Each time that the aid station moves, the battalion surgeon notifies three individuals.

First is the battalion commander, who is then responsible for notifying all subordinate unit commanders. They in turn see that the information is passed on down to their men. If this chain of information is not completed, walking wounded will continue to go to the last known location of the aid station. Your sketch shows that the regimental command post is about 1,200 yards from here.

The second individual to be notified is the regimental surgeon. He must know the new location because it is his responsibility to send reinforcements and replacements to the battalion medical section as required. The regimental aid station is about 1,500 yards south of us, near the regimental command post.

The third person to be notified is the commander of the collecting company charged with evacuating casualties from this battalion's aid station. The collecting station in this case is located about 2,000 yards to the southeast of the aid station. It is not shown on your sketches.

The collecting station is not a part of the medical detachment of the regiment. It is a division medical installation, a part of the division medical battalion. Each division medical battalion has three collecting companies and a clearing company. Ordinarily, one collecting company is placed in support of each combat team of the division, to evacuate wounded from the battalion aid stations and the regimental aid station. Each collecting company has 10 ambulances and 40 litter bearers, with which to evacuate casualties, by way of the collecting station, to the division clearing station.

The battalion surgeon was informed by messenger of the battalion commander's plan for the renewal of the attack. (In some cases he might go to the battalion command post to obtain this information personally.) Studying the plan, the battalion surgeon estimated that most of the casualties would occur in the left portion of the battalion zone when Company I left the protection of the woods to assault RIDGE 23. This made it advisable to locate the aid station in the left portion of the zone.

Before selecting the exact site, the battalion surgeon studied what are called the "lines of drift." These are the defiladed routes which litter bearers and walking wounded naturally select for the safety and ease of movement they afford. Just east of the aid station, you see several shallow draws converging from the zones of Companies I and L. These draws constitute natural lines of drift. The battalion surgeon placed his aid station close to the point of convergence of these routes and as far forward as concealment from the enemy would permit.

The battalion surgeon's decisions on successive locations for the aid station are submitted in the form of recommendations to the battalion commander. Of course in an attack, there is seldom an opportunity for extended consultation between the two officers, and the surgeon's recommendations are usually accepted as a matter of course. Sometimes a mortar platoon or other unit may want to use the site the surgeon has selected. When this occurs, the battalion commander decides who shall use it.

When the battalion was in its assembly area early this morning, a contact agent from the division collecting company in support of this regiment joined the medical section. When the section displaced forward, the agent accompanied it to the new location. He has now returned to the previous site, where he will meet the litter-bearer detail from his company and guide it to the present position. This detail will carry the information back to the foremost ambulance post, from where it will reach the collecting station. Repetition of this procedure each time the aid station displaces keeps the process of evacuation moving smoothly.

At the aid station there are two main departments: litter-wounded and walking-wounded. The battalion surgeon ordinarily operates the litter-wounded department. During the march, and later during development and deployment of the battalion, he is principally concerned with the tactical employment of the battalion medical section, and at this time, is usually with the battalion commander's staff. When combat commences and casualties begin to accumulate, he returns to the aid station. However, he remains in touch with the tactical situation of the battalion. He must always know the location of units within the battalion and the areas in which casualties are occurring. He must be constantly planning his next displacement forward. If he waits too long before displacing, the litter hauls will become excessively long, thus delaying unnecessarily the evacuation of the wounded. Two surgical technicians assist the battalion surgeon in the litter-wounded department.

The medical administrative officer operates the walking-wounded department, assisted by a staff sergeant and a medical technician. When the battalion surgeon leaves the station on reconnaissance, the administrative officer takes over his duties, while a staff sergeant takes charge of the walking-wounded department. If the battalion surgeon so desires, he may himself operate the walking-wounded department, and the administrative officer the litter-wounded department.

A clerk, a medical technician, keeps the station blotter on which are recorded the name, diagnosis, and disposition of all casualties entering the aid station. He has an addressograph to assist him in performing this job.

The clerk demonstrates the use of the addressograph.

INSTRUCTOR:

A corporal has charge of the sterilization of instruments and the administration of hypodermic medication. He administers morphine, on the order of a medical officer, when required to lessen pain, thus diminishing shock. He also has charge of the administration of blood plasma.

Two medical technicians drive the section's two vehicles, a ¼-ton truck with trailer and a ¾-ton weapon carrier. These trucks are used, whenever possible, to move the section's personnel and equipment. The ¼-ton truck is also used to assist the litter bearers in clearing casualties from areas which are accessible to and safe for vehicles. Usually, this is possible only at night. In our situation today, vehicles cannot be used by daylight in the open ground just behind the attacking companies, and the trucks and drivers are therefore with the rest of the battalion transportation somewhat to the rear.

Let us look at the equipment of the medical personnel.

Clerk steps before the class. He exhibits each item of equipment as the instructor mentions it.

INSTRUCTOR:

This man wears a pistol belt and a broad web suspender. The suspender is designed to carry heavy weight, such as a man on a litter. The webbing takes the weight from the arms and hands and distributes it on the bony frame of the body, leaving the hands free to steady the load. This man carries a small hand ax which can be used to cut poles for improvised splints and litters. Other men carry intrenching tools. Those two pouches attached to his equipment contain dressings, bandages, adhesive tape, iodine swabs, bandage scissors, safety pins, emergency medical tags, and aromatic spirits of ammonia. The pouches can be expanded greatly

to carry extra dressings. Litter bearers and company aid men are given these extra dressings in the final assembly area at the same time that the other troops are issued extra ammunition. Using both pouches, a man can carry 30 additional dressings like those in the individual first-aid packet with which you are familiar.

Most of the battalion medical section's equipment is carried in two identical pack units, one for the litter-wounded and one for the walking-wounded department. Each pack unit contains six packs of medical equipment, with a pack board for carrying as an individual load.

Pack No. 1 contains four canvas inserts, in which are carried articles such as dressings, bandages, adhesive tape, sulfanilamide powder, morphine syrettes, stethoscope, a sterilizer and alcohol heating unit, essential surgical instruments, and catgut sutures. This pack weighs 57 pounds, including the pack board.

Pack No. 2 also has four canvas inserts, containing miscellaneous small articles, chiefly dressings, bandages, sulfanilamide powder, and chemical heating pads which generate heat on the addition of a few teaspoonfuls of water. These are very useful in treating shock. This pack weighs 49 pounds, including the pack board.

Packs Nos. 3 and 4 each contain six woolen blankets. Including pack board, each weighs 45 pounds.

Pack No. 5 is a complete splint set—traction splints, wire-ladder splints, and basswood splints. The set, with pack board, weighs 68 pounds.

Pack No. 6 is a five-gallon water can with an adapter to facilitate lashing the can to its pack board. This load, including pack board, weighs 60 pounds.

A total of 12 litters is included in the aid-station equipment.

Here is a standard Army-Navy plasma unit.

Instructor and clerk set up plasma unit and demonstrate operation.

The battalion medical section carries 2 of these units per 35 men of the organization it serves. Each unit consists of two sealed cans containing both plasma and equipment necessary to administer it. Each unit provides 500 cubic centimeters of reconstituted plasma.

In addition to the equipment you have seen, there are some other items which are used only in camp and bivouac and which, during combat, are carried on the vehicles. These are a large medical chest, which is virtually a portable dispensary, five five-gallon water cans, and a Lyster bag.

Demonstrators simulating casualties of various types begin entering the aid station at intervals. The aid station personnel simulates appropriate treatment of each.

INSTRUCTOR:

Casualties are beginning to arrive at the aid station. Walking wounded usually accompany litter bearers, who guide them to the station, but many come in alone.

A litter team enters carrying a casualty. One of the litter bearers carries a note which he gives to the battalion surgeon.

INSTRUCTOR:

That litter team has just brought a message from a company aid man in the zone of Company L.

SURGEON (*reading message*):

"Company L has taken RIDGE 23. Now moving toward HILL 24. Twelve wounded on south slope of RIDGE 23. O'Brien has been killed. I need help. (signed) JONES."

Brown, you follow these litter bearers and report to Captain Company L as a replacement for one of our company aid men.

Brown, a medical technician, salutes, secures his equipment, and moves out with the litter team.

INSTRUCTOR:

One of the aid men with Company L has been killed, and the battalion surgeon is replacing him with a member of the aid-station squad.

The battalion surgeon writes a message and turns to one of the surgical technicians.

SURGEON:

Smith, take this message to the battalion CP and have it sent through the message center to the regimental surgeon. You will find the CP up that draw (*pointing*) about 300 yards. Hurry back. We need you here.

INSTRUCTOR:

Now the battalion surgeon, having sent one of his aid station squad as a replacement for the company aid man who was killed, is asking the regimental surgeon for a replacement in the aid-station squad.

The surgical technician moves off at the double. The surgeon makes a hasty examination of the casualty left by the litter team, then has the man moved to a position in front of the class. There the casualty is given a simulated plasma injection.

INSTRUCTOR:

Some men who come to the aid station have superficial injuries and are able to return to duty after being treated here. However, in treating the casualties who must be evacuated to the rear, the aid station has only one objective: to prepare these casualties for evacuation so that they will arrive at evacuation hospitals in the best possible condition for operation or other treatment.

In order to accomplish this, the aid station controls hemorrhage, tries to prevent infection, and attempts to prevent or treat shock. A wounded man who dies before he reaches an evacuation hospital (or a mobile surgical hospital for nontransportables) usually dies of bleeding or shock or a combination of the two. Rapid, severe loss of

blood alone will cause shock. Later on, a casualty may die of infection, but this is usually a matter of days or even weeks.

A litter team brings in a new casualty. Another casualty follows, walking.

INSTRUCTOR:

There, for instance, is a litter patient who has a shell fragment buried deep in the muscles of his back. If the surgeon attempts to operate on him here, he will be exposed to additional infection, and his ultimate chance of recovery will be reduced. The operation will also add to his shock. It is better merely to control the bleeding, apply a dressing over the wound to prevent the introduction of additional infection, give morphine to relieve pain, wrap the man well to conserve his body heat, and send him to an evacuation hospital where he can be operated on under more favorable conditions. If, on the other hand, nothing were done here for this man, he would probably go into shock and die before reaching the hospital, which may be anywhere from 8 to 20 miles to the rear.

Over in the walking-wounded department, the assistant battalion surgeon is working on a casualty with a phosphorus burn on his forearm. The phosphorus has burned through his clothing and will continue to burn his flesh until it becomes coated with an inert oxide as the result of its own combustion. If this man were sent to the rear without treatment, his clothing would constantly tend to rub off the oxide, whereupon the phosphorus would commence burning again. The man might incur so severe a burn as to disable him permanently. In any case, his final recovery would be greatly delayed. The treatment given here is the application of a copper-sulphate solution to the burn. The copper sulphate unites with the phosphorus and makes it relatively inert. The surgeon then picks out the particles of phosphorus and applies a dressing. The burn, if so treated soon after incurred, will be a relatively minor one, and the soldier will return to duty in a correspondingly short time.

Another litter team brings in a casualty.

INSTRUCTOR:

Here is a man with a wound and fracture of the thigh. The surgeon is replacing the improvised splints with prepared splints. Proper splinting and antishock treatment are absolutely essential before a casualty of this type can be evacuated. In 1914 and 1915, 58 percent of British fracture cases died of shock before reaching evacuation hospitals. Even if an untreated fracture case should survive the shock, failure to splint the fracture carefully might result in permanent disablement through damage of tissues by bone fragments. The surgeon here can "put up" the fracture so that very little additional manipulation will be necessary before a cast is applied. The splints applied here will be left on the casualty until he reaches his final destination. He will even be kept wrapped in the same blanket on the same litter, in order to avoid moving him unnecessarily. As he successively passes each medical installation, a pair of splints, a blanket, and a litter will be sent by that installation to the next forward unit. In this way, the limited supply of these articles at the front is kept constantly replenished.

A soldier enters the aid station coughing.

SURGEON:

What's the trouble?

SOLDIER:

Some shells fell near my squad, and some kind of gas spread around us. I didn't get my mask on right away, and the sergeant told me to come back here.

SURGEON:

What did the gas smell like?

SOLDIER:

It smelled like old musty hay.

SURGEON:

Lie down on that litter, and we will take care of you.

Casualty lies on litter, is wrapped in blankets, and a venisection (bloodletting) is simulated with syringe, basin, and colored water.

INSTRUCTOR:

This man has inhaled phosgene gas, and the surgeon is letting about a pint of blood out of the vein in the bend of his elbow. The soldier does not feel very ill. However, if he should be returned to duty or permitted to walk back to the collecting station, he might collapse suddenly at any time within the next 12 or 14 hours, go into severe shock, and die. Properly cared for, he will probably make an early recovery.

Since phosgene is nonpersistent and does not cling to clothing or equipment, this man is not dangerous to others near him. A mustard-gas case, however, would immediately be segregated and treated in a separate area of the aid station.

The contact agent, a noncommissioned officer, and three litter teams from the collecting company enter the area. They are followed by a ¼-ton truck with a litter carrier.

INSTRUCTOR:

The contact agent has guided these men from the collecting company forward from the previous location of the aid station. They are bringing litters, blankets, and splints to replace those which went to the rear with the last load of casualties from this station.

The ¼-ton truck with litter carrier is useful in terrain which is not passable by an ambulance. When the tactical situation permits employment of vehicles, they are always used in preference to litter teams in order to speed up the process of evacuation.

The collecting company personnel pick up the waiting litter patients and load them on the litter carrier. The truck moves out, followed by the personnel, including the walking wounded who have been dressed. The contact agent remains at the station. Now a casualty stumbles into the

aid station holding his abdomen and groaning and crying with pain. He is led to the litter-wounded department and placed on a litter. The surgeon examines him.

SURGEON:
What seems to be the trouble?

CASUALTY:
I've got a terrible pain in my belly—I can't walk.

SURGEON (*pressing on abdomen*):
Does it hurt here?

PATIENT:
Yes, sir; it's killing me.

SURGEON (*examining knee*):
Does this hurt?

PATIENT:
Oh, don't do that—it's terrible.

SURGEON (*bending man's neck with one hand and pressing on abdomen with the other*):
Does this hurt?

CASUALTY:
Oh, don't touch my neck.

SURGEON:
Soldier, there's nothing wrong with you. You are goldbricking. Get off that litter.

Soldier gets up, looking scared.

SURGEON:
Now, either you go on back to your unit, or I am going to turn you over to the MPs charged with desertion.

CASUALTY:
I'll go back. I'm sorry sir. Give me another chance, and I'll be all right.

SURGEON:
Well, get going.

Soldier takes off rapidly.

INSTRUCTOR:

That is a type of case that occasionally turns up at the aid station. Usually these men are immediately arrested and charged with desertion. Sometimes, they are allowed to return to duty, if they seem anxious to do so.

A litter team enters the station, followed by a soldier who has one hand on a litter bearer's shoulder and walks uncertainly, sometimes stumbling. The surgeon examines the man's eyes, then leads him over to a tree, where he sits down.

INSTRUCTOR:

The man who has just come in is apparently blind. However, the surgeon can find nothing wrong with his eyes. There is no evidence of injury; nevertheless, the man cannot see. He is not a malingerer; he is not faking blindness. He is suffering from what was once called "shell shock," because it was believed that the concussion of shells caused the condition. When it was found that men who had never been near an exploding shell suffered similarly, these cases were referred to as "battle exhaustion" cases.

A man succumbs to this type of "exhaustion" because he finds himself in what is, for him at least, an intolerable situation. Perhaps he has an unusually strong revulsion from the act of killing. Perhaps he has an overpowering dread of being killed or maimed. At the same time, he feels keenly the disgrace of running away. His subconscious mind finds an escape for him from this situation: He becomes blind or paralyzed, or subject to some other incapacitating affliction. Such a manifestation is called a functional disorder; that is, it is the result of a mental conflict and not of any physical injury to the body.

These cases may, with proper psychiatric treatment, become normal to the extent of recovering from functional disorders. But they should never be returned to duty when they cannot be educated to readjust themselves to the conditions which brought on their attack.

If a man is found, during training, to have a mental personality such that he might become a "battle exhaustion" case, he should not, of course, be sent into combat. Nevertheless, many such individuals are not detected until they get into battle. They constitute a major problem for the medical service. Nothing can be done about "exhaustion" cases at an aid station. They are evacuated to the rear and turned over to the division psychiatrist. Care should be taken to separate the true cases of "exhaustion" from the malingerers.

A soldier enters the aid station and reports to the surgeon.

SOLDIER:

Sir, the regimental surgeon directed me to report to you as a replacement.

SURGEON:

You will take over the duties of a surgical technician in the litter-wounded department.

INSTRUCTOR:

Here is the replacement sent forward in response to the battalion surgeon's message to the regimental surgeon. The replacement has probably been taken from the headquarters section of the regimental medical detachment. During combat, the headquarters section is usually better able to spare a few men than are the battalion sections.

A walking casualty enters the aid station with a slight wound in the forearm. The administrative officer examines the arm.

ADMINISTRATIVE OFFICER:

Well, this isn't much of a wound.

CASUALTY:

I know that, sir. I didn't want to come back, but my squad leader ordered me to.

ADMINISTRATIVE OFFICER:

Do you want to return to the line?

CASUALTY:

Yes, sir. I'm all right.

ADMINISTRATIVE OFFICER:

Well, I think you are O.K. for duty. But your squad leader was right to send you to the rear. You shouldn't take unnecessary chances with any injury. I'll put a dressing on this arm and send you back.

INSTRUCTOR:

Only those casualties who require further treatment are evacuated to the rear. If a soldier, after emergency treatment, is thoroughly fit to fight, he rejoins his unit. The decision to evacuate a casualty is up to the battalion surgeon or the administrative officer.

Two members of the aid-station squad, after examining a quiet litter casualty, carry the litter to one side of the area and roll the casualty off onto the ground.

INSTRUCTOR:

That casualty, who had a skull fracture, has died. A burial detail of the graves registration service will take care of the body later.

An enemy prisoner, with a slight hand wound, is brought in under guard. He is given routine attention.

INSTRUCTOR:

Prisoners of war are given whatever medical care they require at the aid station. They receive neither more nor less attention than our own wounded. This is one of the rules of land warfare, to which we are pledged to adhere and to which we hope that the enemy is likewise adhering.

A soldier enters the aid station from the direction of the battalion command post and hands the surgeon a message.

SURGEON (*reading*):

"Battalion has taken HILL 22 and RIDGE 23 and is now preparing to advance toward HILL 24. Battalion CP moving to draw (30.0-23.8). Report of casualties desired at once. (Signed) HILLDRING S-3."

Clerk, give me a report of the number of casualties since 0600.

The clerk examines the blotter, writes on a slip of paper, and hands the paper to the surgeon, who signs it and passes it to the messenger.

INSTRUCTOR:

Of course some casualties from the 3d Battalion may have gone to other aid stations or even found their way to the collecting station without passing through any aid station. However, this report is accurate as far as it goes, and the battalion commander can usually obtain it more quickly than he can get a complete report from all of his companies.

SURGEON:

Messenger, wait a minute. I want you to guide me to the new location of the command post.

The surgeon studies a map and motions for the administrative officer, who comes over to him.

SURGEON:

Lieutenant, the battalion seems to be about 1,200 yards north of us. I am going forward to look for a new aid-station site to cut down the length of the litter haul. As soon as the rest of the casualties have been dressed, pack up and be ready to displace again. I will take the contact agent with me and will send him back to act as a guide for you. If there are any unevacuated casualties when you leave, have a surgical technician stay with them. I will meet you at the new site.

The surgeon, contact agent, and messenger move out.

ASSISTANT SURGEON:

Sergeant, we will not be able to move until the contact agent comes back to guide us and until all our litter teams have returned. But, while we are waiting, get everything packed and ready to go.

STAFF SERGEANT:

Corporal, get packed and ready to move.

CORPORAL:

All right men, pack up.

CHAPTER 14

A Platoon's-Eye View of Combat Training

How can we produce rifle platoons capable of performing the limitless variety of missions which commanders demand that they perform and combat observers demand that they be taught to perform? Consistently, reports from combat areas stress that this is a platoon leader's and a squad leader's war. Once the small units are committed to battle, the fate of armies is in their hands, and all the pencil chewing in the world back at headquarters, from the company on up, will not help them fight their all-important little skirmishes.

Let us try to boil platoon functions down to their simplest elements, leaving out or submerging all nonessentials, and thus simplify the job of both the leaders and the troops.

A rifle platoon's job in combat is simple, although it is far from easy. A platoon performs no classic evolutions on the battlefield. It does just three things during battle: *move, attack, hold.* It also observes, reconnoiters, fires, and secures itself against surprise, but it does these things in the normal course of events while performing its three basic operations: to move, to attack, and to hold. Moreover, it always performs each of these functions according to certain rules which never change, regardless of terrain, weather, or time.

A platoon has a very restricted and distinctive viewpoint during combat. It is completely wrapped up in its own little battlefield. Although the platoon starts out with a knowledge of the missions of the company and battalion of which it is a part, after a fire fight has commenced it frequently is only vaguely aware of what the rest of the company is doing and has no idea at all of what the battalion is doing.

The platoon may not know whether the battalion is executing an approach march, a pursuit, or a reconnaissance in force. For the platoon may legitimately be attacking when the battalion is still in the approach march, or it may be only "approaching" after the battalion has launched a coordinated attack.

The point is that, although our field manuals, necessarily, are written in general from the viewpoint of the company, battalion, or higher unit, our small-unit training should not be conducted from the same viewpoint. If we are to make the training of a platoon simple, we will not try to tell it how it operates "when the battalion is the advance guard" or "when the battalion is in the approach march." Instead, we will teach it simply to move, attack, and hold under various combat conditions. When it can do those things well, it can take any part in the advance guard, approach march, or other larger unit formation, and function efficiently.

Actually the platoon goes through a more or less uniform cycle of events, over and over, hour after hour, day after day, regardless of what other units around it are doing. There are several distinct conditions under which the platoon operates during the cycle. The platoon leader who can recognize and cope with each of these phases as it occurs is a good platoon leader.

PHASE 1. *Contact with the Enemy Unlikely*

The platoon leader is reasonably certain of arriving at his immediate objective without meeting serious resistance. Therefore speed is the first consideration. The platoon will march on roads, trails, and open, firm ground where it can move easily and speedily. But it will take no chances of being surprised by a small enemy group.

The platoon leader provides all-around security by means of scouts, small patrols, and designated observers to the front, flanks, and rear. By taking all the men for security missions from a single squad, he retains tactical unity, keeping two complete squads intact. He sends out the security patrols as far as possible without losing control of

them, keeping them within range of supporting rifle fire as much as possible. He makes his men march in such a dispersed formation as will prevent excessive casualties from a burst of automatic fire. During the march he makes a constant visual reconnaissance ahead, in order to anticipate and be ready to meet any enemy action.

The platoon leader's primary consideration during this phase is to maintain the required marching rate, and security measures must be such that they will not lessen it.

PHASE 2. *Contact Expected, but Enemy Location Unknown*

The platoon leader expects to meet the enemy at any time during the march, but he has no immediate indication of the enemy's presence except, perhaps, long-range machine-gun fire or unobserved artillery fire. He is now less concerned with speed than with readiness for combat. So he avoids roads, trails, and open areas. He follows concealed routes whenever possible. He further deploys his squads so that they are ready to maneuver rapidly, to hit hard and fast. This deployment also gives the platoon more dispersion and incidental protection from small-arms and artillery fire.

The platoon is now in fighting formation. It avoids exposed danger areas, but pushes on as rapidly as possible, consistent with concealment and readiness to fight. The platoon leader does not know whether the enemy is 500 yards or 2 miles away. It may be an hour before he is encountered at close range. Therefore, the platoon's advance is delayed only as much as is necessary to avoid surprise.

PHASE 3. *Enemy Presence Known, but Aimed Small-Arms Fire Not Encountered*

The platoon leader knows that the enemy is near, probably within effective range of small-arms fire. There is a strong possibility that the platoon will have to fight within the next few hundred yards.

There are various ways in which the platoon leader may know of the enemy's nearby presence: by sight, sound, smell, action of civilians or of animals, or, less frequently, intelligence reports of higher units. Leading elements of the platoon may see enemy equipment, earthworks, or personnel. The sound of voices, of men working, of vehicles, or of firing may be heard. Native scouts or war dogs sometimes smell Japanese units, and anyone can smell cooking. Civilians scurry for cover when they see trouble approaching. Excited action of animals or birds is an indication of the presence of men. Intelligence reports, however, will seldom be detailed enough to tell the platoon leader exactly when or where he will run into small enemy groups.

At any rate the platoon has as yet encountered no aimed small-arms fire. This may be because the enemy has not discovered the platoon, because he knows of its presence but cannot yet see it, or merely because he is waiting for it to advance closer.

At this point the platoon does not know the enemy's precise location. Even if an enemy group has been seen or heard, there may be other, closer groups which are more dangerous to the platoon mission. The platoon needs additional information before it can intelligently maneuver and attack.

There is only one thing for the platoon leader to do, and that is to continue to move toward his objective, using the most covered route available, until the leading elements can locate the enemy—not just any enemy, but the particular group which is blocking the approach to the platoon objective. When this enemy group has been located accurately enough to engage with effective small-arms fire the area which it occupies, the platoon will be in a position to make a coordinated attack using fire and maneuver; and not before then.

The platoon approaches as secretly as possible. The enemy may not be aware of its presence. Even though the enemy is firing, his fire may be directed at other nearby units. And, even if occasional bursts of unaimed fire are

being directed into the platoon's vicinity, the enemy may not know its strength, exact location, or direction of movement. In any of these cases, the platoon continues to move with caution and silence.

A patrol of from four men to one squad should precede the bulk of the platoon. The patrol advances by infiltration, with some men always in firing position ready to engage any enemy who may appear. Every advantage is taken of natural concealment. The advance is by creeping and crawling whenever necessary. The platoon leader holds the rest of the platoon under close control and follows the advance patrol by short bounds. He keeps the remaining squads far enough back to insure that they will not be pinned down by enemy fire which may be directed at the leading patrol.

On the other hand, if the enemy obviously knows of the platoon's presence and intentions—that is, if he is pouring a considerable volume of fire into its vicinity or if his local outposts have sighted the platoon and it is apparent that he is lying in wait with finger on trigger—secrecy ceases to be of prime importance. The platoon advances just as before, except that every movement by an element of the platoon is covered by a good volume of fire from the remainder. This is area fire, for the platoon has not yet seen and located the enemy. It consists simply of firing or throwing hand grenades into every place of concealment that may hide an enemy. Supporting fires of automatic weapons, mortars, and artillery, if the platoon leader can obtain them, are directed on areas to the front and flanks where the enemy is suspected or known to be.

The platoon leader thus continues the advance by short, cautious bounds in the assigned direction toward the assigned objective and does not allow the platoon to be diverted from its mission by battle noises in other localities.

PHASE 4. *Aimed Small-Arms Fire Encountered, but Enemy Not Located*

The leading elements of the platoon are now receiving effective rifle and automatic fire. They have been seen by

the enemy. When individuals or small groups get up or try to move, hostile fire is promptly directed at them.

This fire comes from several directions. The general direction of each enemy weapon can be determined from its sound, but the platoon leader cannot see and locate any of these weapons. He knows only their general direction and that they are from 100 to 600 yards away. This is a normal situation, for both the Japanese and the Germans are skillful at concealing muzzle blast by firing through bushes and buildings, and their powder smoke is difficult to see except from extremely close range.

What action can the platoon leader take under such circumstances? This is a mystifying situation and one which bewilders inexperienced troops. It is not the clear-cut problem which was usually presented to them in training. Why? Because the first item of information in most training situations was the definite location of the enemy and of his flanks.

The answer is simple enough, though. The platoon leader must find the enemy—that particular small group of enemy which most directly impedes the movement of the platoon to its objective. Until that is done, he can only continue the line of action started in phase 3: covering all movement with fire. Supporting fire by machine guns, mortars, and artillery is requested on all areas from which hostile fire is coming. Each time that such supporting fires come down, the platoon moves forward promptly, taking instant advantage of the assistance which they provide. The platoon leader may strengthen the leading patrol to enable it to push ahead more aggressively, with increased fire power.

If the leading patrol is stopped by too heavy a volume of fire, it is left in place to fire toward the enemy while another patrol (or two patrols) is sent to the flank to seek a more covered approach and to continue the advance.

When advancing upright is no longer feasible, leading elements of the platoon continue forward by creeping and crawling until they locate the enemy. The platoon leader retains close control of the bulk of the platoon and holds it

under cover as long as possible, until he has sufficient information to formulate a plan of maneuver and attack.

PHASE 5. *Enemy Located and Engaged with Aimed Small-Arms Fire*

The leading elements of the platoon may still be unable to see any enemy soldiers or weapons, but they are now close enough to the firing positions to determine by sound, within 50 to 100 yards, the areas from which the fire is coming. They can pick out the individual shadows, clumps of foliage, haystacks, windows, or doorways where enemy riflemen and machine gunners are undoubtedly concealed. And they can place effective aimed fire on these danger spots. If an enemy leaves his cover, he becomes a casualty.

As soon as the platoon commences this aimed fire, the enemy is "fixed." He is fixed not only physically, but mentally as well: His attention is focused on those elements which are shooting at him. Now he must be held in place by this base of fire while the rest of the platoon moves in on him from a different and unexpected direction.

Before launching this maneuver, the platoon leader arranges for all possible supporting fires on the immediate enemy position and on adjacent areas where other enemy weapons may be emplaced. He also arranges for the fixing, or base of fire, element of the platoon to fire faster as the maneuver commences. Some time—25 minutes or even longer—may be required to make necessary arrangements, issue orders, and inform the entire platoon of the plan; in short, to coordinate the platoon's assault. This time must be taken, however, because an uncoordinated assault can be stopped disastrously in a few seconds by a single automatic weapon firing unhindered.

PHASE 6. *Assault; Pursuit by Fire; Reorganization*

The maneuvering riflemen have now arrived within rushing distance of an enemy firing position. This may be any distance up to 100 yards. It should not exceed that approximate distance for two reasons. First, because too long a

rush will exhaust the troops and they will need all their energy when they arrive on the objective. Second, because the assault must be completed rapidly to take full advantage of the short period of intense supporting fire, when the enemy has his head down for a few seconds. Troops must close with the enemy suddenly, fight and finish him and get under cover before adjacent hostile groups can collect themselves and open accurate fire.

If there are substantial obstacles in the way of the assault—barbed wire, antipersonnel mines, dense jungle growth, or steep mountainsides—the length of the assault must be greatly reduced. It may have to be completed by creeping and crawling from one bit of cover to the next.

When the maneuver element is in readiness in its assault position, it suddenly increases its rate of fire to the maximum, to force the enemy to keep his head down. This overwhelming volume of fire can last only a few seconds, and it is the signal for everyone to prepare to rush. The increased rate of fire is immediately taken up by the base of fire and by the supporting weapons. When the fires reach maximum volume, the maneuvering element, if close enough to the enemy, showers his position with grenades. Immediately afterward, all close for the kill.

At the conclusion of the assault, some weapons are immediately pushed forward to fire upon the retiring enemy, as well as to resist counterattack. Reorganization is completed rapidly and under cover. There is every reason to expect the enemy to place prepared artillery or mortar fires on his abandoned position. Therefore the reorganization should take place either in front or in rear of the position. Men must not relax or stand in groups. Their job is not finished. Other hostile groups and machine guns are probably entrenched nearby. Counterattack must be guarded against, and the attack continued as soon as possible.

PHASE 7. *Continuation of the Attack*

Phases 3, 4, 5, and 6 usually will be repeated several times before the platoon either reaches its assigned objective, or is forced to stop temporarily and organize for defense.

PHASE 8. *Organization and Defense of Ground*

The platoon may have arrived on its objective, or it may be stopped, unable to advance, short of that objective. In either case, no immediate move is contemplated, and the platoon now organizes to hold what it has. It will never have time to waste. Within 5 minutes, local security should have been posted, and all individuals should have selected hasty firing positions and fields of fire. The platoon should be ready to fight, as local counterattacks may be expected in 10 to 20 minutes. In 15 minutes or less, the platoon leader should have perfected detailed dispositions, and the men should start to dig. Within one hour, counterattacks permitting, all personnel should have either sitting-type foxholes or shallow, prone firing trenches, depending on the hardness of the ground. The platoon is now ready to resist a strong attack, although improvements of the position will continue indefinitely.

* * * * * *

That is the platoon's-eye view of war. The battalion, the regiment, and the division may be engaged in a reconnaissance in force, a brilliant double envelopment, a masterly withdrawal from action, or a relentless pursuit; but to the rifle platoon it is just phases 1 to 8, over and over again.

Sometimes a platoon passes suddenly from phase 1 to phase 4 or 5 in 15 seconds (a meeting engagement, the book says). Sometimes it passes clear from 1 to 8 without a fight at all.

The important thing is for the platoon leader to recognize each phase as it develops, and take the necessary action. There are no clear-cut situations in combat, and there will be no umpire with a white band around his hat, to meet the platoon leader in the woods and say: "The route march has just ended. You will deploy your platoon off the road and move forward along concealed routes. Contact is imminent." Nor will anyone tell the platoon leader: "The approach march is finished. The enemy is there. Our front line is here. You will set up a base of fire and attack with fire and maneuver."

These things occur only in training exercises. In battle, the company or battalion will sometimes make coordinated attacks against located enemy positions. But most of the time, between these brief moments of coordinated action, the platoon will stumble in and out of phases 1 to 8 very informally, all alone, and quite regardless of the company or battalion picture.

This small-unit viewpoint of combat suggests several ways of simplifying and improving the training of the rifle platoon.

Train by platoon combat phases. In initial combat training, avoid such all-inclusive descriptions as "advance guard," "flank guard," "platoon in attack." Start with phase 1 and practice it over and over until the platoon automatically and almost without orders falls into the proper formation and takes the proper security measures on any terrain, by day or night. Then go on to phase 2 and do the same thing. Keep on progressing, one phase at a time. Repeat this instruction frequently as a series of brief drills. Organize a few two-sided exercises with flank guard, advance guard, or similar situations to add realism and sustain interest. These will not be training exercises. They are for the purpose of testing the platoon and sustaining interest.

Make training exercises accurately reflect combat conditions. This rule should be applied to the "enemy" situation. The conduct of the enemy detail requires as much study and preparation as that of the platoon. The enemy detail should be taught to dispose itself and to maneuver as skillfully and deceptively as the Japanese and Germans have in combat. It should be concealed and camouflaged so as to be invisible at more than 100 yards. Avoid the easy practice of stationing a single small enemy group on the most obvious terrain feature in sight. Instead, divide the detail into several small groups, each with a machine gun, and locate them in mutually supporting positions over a wide front. There should never be any targets or even target areas pointed out or marked on the ground. The sound of firing is the only "marking" on the battlefield. In training, as in combat, the enemy situation as known must be scant and vague.

Accustom subordinates to responsibility. Give the squad leaders opportunities to make decisions, to test their own judgment by trial and error, and thereby acquire self-confidence.

Teach your leaders to think. Don't try to teach them everything by talking. Hammer home a few simple rules of thumb and then show how the rules can be applied to any situation, anywhere. The facts are all in the field manuals anyway. Repetition only puts the men to sleep. Keep the exhortations short and the practical work long. Above all, stick to the platoon viewpoint.

CHAPTER 15

The Patrol Close-Combat Firing Course

Every combat soldier of the Army Ground Forces must be mentally, as well as physically, prepared for the shock of battle. He must be able to perform his mission regardless of noise, confusion, and surprise. During his training, he should experience, as far as possible, the sights, sounds, and sensations which are to be expected in combat, and should be confronted with as many as possible of the situations which he may encounter.

In February 1943, Army Ground Forces established a number of special battle courses to meet these requirements. Included in these are: close-combat firing courses, combat-in-cities courses, infiltration courses, simulated air and tank attacks while troops are in foxholes and slit trenches, and combat problems involving overhead and flanking artillery and small-arms fire.

The ultimate aim of this type of training is to give every combat soldier battle inoculation, a "shot in the arm," which will increase his resistance to the initial shock of battle.

The original close-combat firing course was designed to train the individual soldier in the quick and accurate use of his basic weapons against surprise and moving targets, while negotiating obstacles and traversing broken terrain. A recent AGF directive has replaced the original close-combat firing course with a patrol close-combat course, to be run by three- or four-man teams. This is the course with which this chapter deals.

The patrol close-combat course is designed to provide the training outlined above and, in addition, teach the soldier the methods and advantages of mutual fire support; to

develop his confidence in the capabilities of the small-unit team; and to emphasize the importance of fire and maneuver and the proper use of cover and concealment.

The soldier must be keenly aware of details of the terrain as he moves through the course, from the standpoint both of possible enemy action and of suitable cover or concealment for himself in the event of such action. When that action does take place, he must instantly choose the proper weapon, gain an advantageous position from which to use it, aggressively make and carry to completion his attack, and promptly resume a condition of readiness. In addition, he must at all times consider the safety of his teammates, particularly the man with whom he is paired in the "buddy" system. He must be prepared always to cover his buddy's movements by fire. He must, when firing, be certain that no teammate is in his line of fire. If the soldier is unarmed when enemy action takes place, he must be ready to use his hands, feet, knees, elbows, the edge of his helmet, or any other improvised weapon at hand in order to accomplish his mission. That mission is to kill.

DESCRIPTION OF COURSE

The course consists of a series of stations, at each of which is presented a situation requiring prompt, vigorous action by one or more members of the patrol before the advance can be continued. Situations vary from a single surprise target, requiring the fire of only one man to neutralize it, to a group of targets or an emplacement, requiring all the fire power of the patrol and, in some cases, the use of a hand grenade.

Varied terrain, lightly wooded, with considerable undergrowth, and cut by small draws or ditches, is most suitable for the course. A course laid out in a deep, winding ravine offers advantages over one on more level terrain. Such a location facilitates the safe delivery of overhead "enemy" fire against patrols; it permits fire by patrols against targets to the flanks as well as to the front; and it simplifies

the concealment of targets and enemy installations. However, regardless of the type of terrain, all targets are located within close-combat range (5 to 50 yards).

On many courses, a requirement is the ability to train large units in a short time. Such a course must be laid out in a number of firing lanes, approximately parallel, in which patrols operate simultaneously. When this is the case, comparatively level terrain is necessary, although small draws and ditches are still desirable. On this type of course, as opposed to the single-lane type situated in low ground, it is almost impossible to include, with safety, overhead fire against the patrols.

Figure 56 shows, schematically, a six-lane patrol close-combat course. Lanes are approximately 50 yards wide and may be from 300 to 500 yards long. Each lane is flanked by a strand of knee-high barbed wire. A line of markers, such as white target stakes or strips of white cloth tied to trees, extending up the center of the lane, will assist the patrol to maintain direction and prevent bunching on the sides of the lane. The intervals between lanes vary in width according to the nature of the terrain. They are wider, to allow a greater margin of safety, toward the end of the course, where fragmentation grenades are used at one or more stations in each lane. The intervals between lanes are used by all personnel in returning from the finish line to the starting point, to avoid making paths down the lanes. A 6-lane course, not more than 500 yards long, and having not more than 12 stations per lane, should have a capacity of about 400 men per day.

A still more desirable arrangement is one in which the lanes radiate like the spokes of a wheel from a central area. The construction of such a course is practicable, however, only under exceptionally fortunate terrain conditions.

Stations in adjoining lanes need not duplicate each other exactly, except that targets requiring prolonged firing or the use of grenades should be located at approximately the same point in each lane. These stations require more time than the others, and, since patrols in adjoining lanes must usually progress at approximately the same rate in order to

comply with safety regulations, this arrangement tends to eliminate long waits in one lane while a patrol in another lane catches up.

PLANNING A COURSE

Since a close-combat course is usually operated concurrently with other instruction (such as an infiltration course, transition firing, field-target firing, or other battle courses), consideration should be given to the selection of an area adjacent to other instructional areas, already established or to be established, whose operation can be coordinated with that of the close-combat course. The speed with which units must complete their training on the course, and the available terrain, will determine whether the single-lane or multiple-lane type is preferable.

Safety limits for all types of fire to be delivered on a course must be established when the installations are completed. Likewise, danger limits of an impact area extending to the limit of the range of the weapons employed must be established. (See AR 750-10 for safety requirements.)

Stations requiring the use of grenades are preferably located in fairly open areas. If this is impossible, one or two clear lanes should be cut through the trees or undergrowth for the benefit of the grenade thrower, in order to minimize the possibility of a grenade's being deflected and exploding close to the patrol.

Metal construction in installations (pillboxes, for example) which are to be fired upon should be avoided, because of the danger of ricochets.

A sound-powered telephone line may connect key points on the course, for use in emergencies and for regulating traffic on the course when necessary.

The variety and complexity of the installations are limited only by the ingenuity of the builders. A thoroughly satisfactory course can be built almost entirely from scrap lumber and from logs obtained in necessary clearing of areas on the course. Most fixtures can be constructed from grenade and ammunition boxes and from scrap metal obtainable at salvage dumps.

Salvaged clothing stuffed with pine straw or excelsior, and painted with enemy insignia, makes excellent bayonet dummies. E-type kneeling silhouette targets, painted in the likeness of enemy soldiers, can be used as rifle targets. Among other items required are pulleys, 1/8-inch aircraft control cable and locks, turnbuckles, sash cord, heavy door

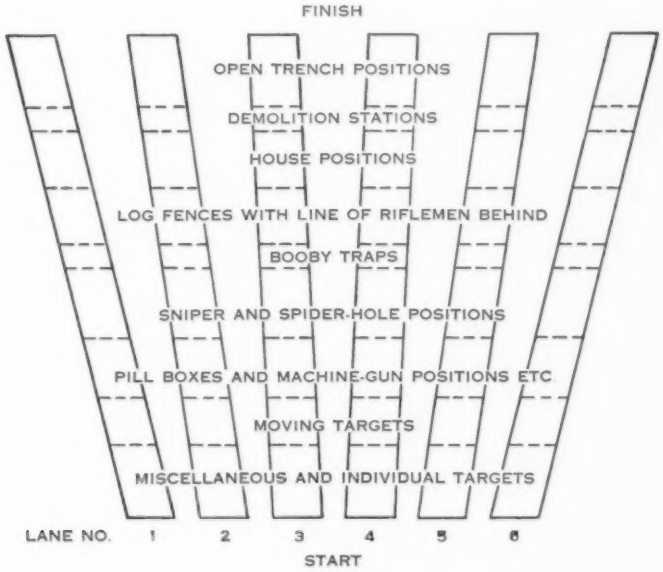

FIGURE 56.—Schematic arrangement of a six-lane patrol close-combat course, showing stations of each type located at approximately corresponding points in each lane.

springs, nails, knife switches, field telephone wire, and mortar-case rods. Two-by-4, 4-by-4, and 1-by-6 lumber, if available, will facilitate construction and considerably reduce the amount of maintenance required. The services of a carpentry shop in making standard types of target frames should be obtained if possible. Standardization of target

frames in three or four types will greatly facilitate replacement and repair. All target frames should be constructed so that targets can be removed and stored in a range house, when the course is not in use, to prevent weathering.

Sturdy construction and heavy sandbagging of houses and pillboxes and the placing of ground target frames, blank firing devices, and control posts below ground level will reduce the amount of maintenance required to repair damage from grenades and rifle fire. In an emplacement at which grenades are thrown, wire netting placed so as to deflect grenades into a pit will help prevent walls from being blown out and targets damaged.

Regardless of the type of course, a basic consideration in its construction is the installation of target controls. The most practical system is that in which a series of control levers can be operated by the coach following each patrol down the lane. (On a single-lane course, at stations where overhead fire is in use, a station operator in a pit to the flank of the course operates both the targets and the weapon delivering the fire.) The control-lever system involves extra work and material in the installation of long control cables and an extensive system of pulley turning points, but is generally safer and more satisfactory than any other arrangement. Figure 57 illustrates the remote control of a single silhouette target. Figure 58 shows the construction of the target frame itself in greater detail.

Control levers are located in a line approximately down the center of the lane. This is particularly important when permanent trained coaching personnel is not available, as any man, with the assistance of a diagram of the course, can easily find the controls for all the targets.

One-eighth-inch airplane control cable, of woven metal, is the most desirable material for control wires. With it, cable clamps and turnbuckles are also desirable, but not essential.

Pulleys are a necessity. One-inch cast-iron single and double pulleys are recommended, except in connection with moving dummy targets operated by counterbalances, when 3- or 4-inch swivel-head pulleys should be used.

If control cable cannot be obtained, ⅛-inch or ¼-inch cotton sash cord may be substituted. The smaller size is preferred, as the larger size has a tendency, when wet, to swell and jam the pulleys. Sash cord is suitable, however, only for short distances through pulleys. For long, straight connections, it should be replaced by 1/16-inch or ⅛-inch galvanized smooth wire. This wire is subject to less ground resistance than sash cord and is not subject to shrinking.

Whenever several control wires run parallel, guide posts should be set in the ground every 20 or 25 feet, extending 2 inches above ground. The control wires are stapled to the posts with a large eye left in the staple, thus avoiding any entanglement of the various controls.

To avoid damage to control wires from live grenades, it is desirable to run the wires at a grenade station through 2-inch pipe for a distance of about 15 feet away from the station. The pipe is buried 4 to 6 inches in the ground at the target, and angles toward the surface away from the target.

Attention may be attracted to the targets by cans filled with pebbles, firecrackers detonated by fuze lighters, blank firing devices, or guns dug into pits and firing either ball or blank ammunition. These may be installed so that they are actuated by the same cables which control the targets.

Figure 59 shows a method of mounting a remote-controlled machine gun to simulate enemy fire. The box is covered with wood, burlap, or canvas to protect the gun from rain, and from dirt spattered from the impact area. The gun is very close to the impact point, to reduce the chance that personnel might cross the line of fire, as the operator of the gun may not be in position to see either the weapon or the impact point at the moment of firing. Fencing the area also is desirable. By the employment of a standard blank-firing attachment, the use of ball ammunition with the gun may be eliminated. If grenades are to be thrown

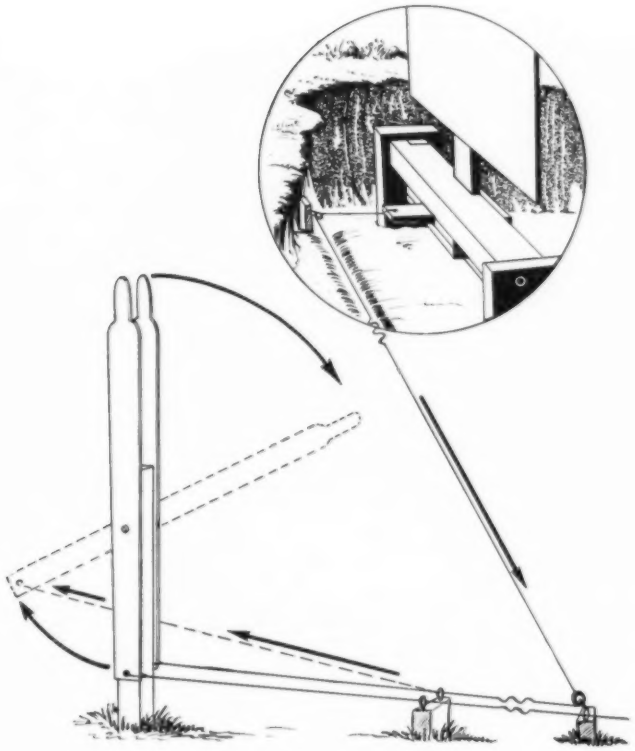

FIGURE 57.—Remote control point, at which levers operate distant targets. Targets at two stations are operated from this point. Insert shows target frame which, when tension on control wire is released, pivots to the rear to a horizontal position in the target pit.

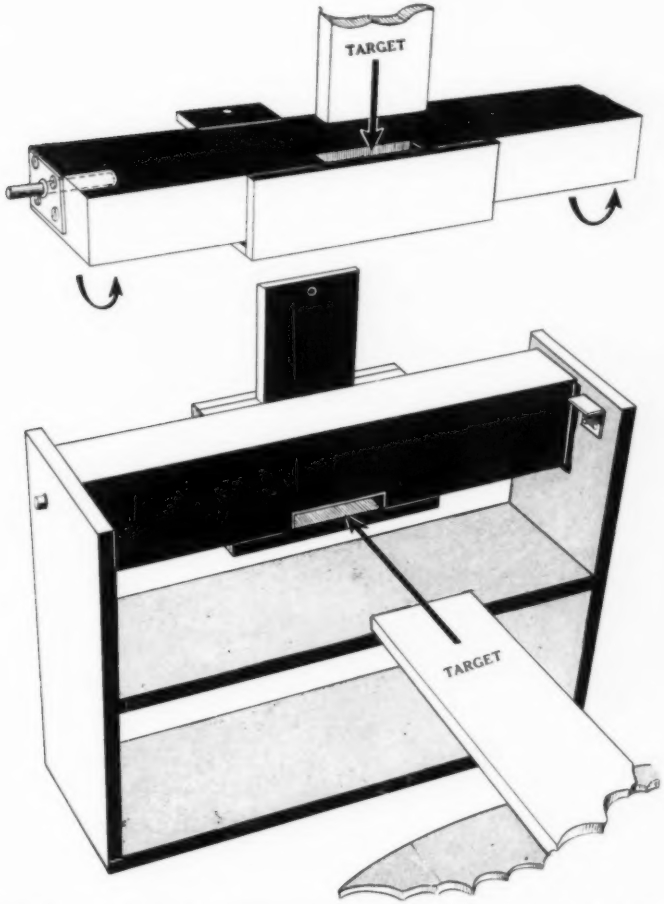

FIGURE 58.—Close-up of target frame shown in Figure 8. In lower view, target if inserted would be in horizontal position. In upper view, movable portion of frame has pivoted so that target would be exposed in vertical position.

at the installation, a sloping cover on the box, leading to a pit or trench, will reduce the possibility of damage to the equipment.

When such damage to equipment cannot easily be avoided, a blank-firing device constructed from a worn-out machine-gun barrel and bolt is recommended. Such a device is illustrated in Figures 60 and 61.

Multiple-lane course

On a multiple-lane course, all enemy action takes place to the front of the patrols. Large installations requiring the application of sustained fire power by a patrol are located near the center of each lane, to prevent the fire from being directed at a wide angle away from the lane. Individual targets may be located in almost any position in a lane, and safety requirements are met by instructing each patrol in the safety limits within which its fire must be confined.

Single-lane course

Targets on a single-lane course may be located to the flanks. However, in no case should the situation require any member of a patrol to turn toward the rear. Overhead fire, when employed, should be delivered a safe distance above the heads of the patrol.

Targets are placed preferably in front of an impact area having a clear back wall extending 10 or 15 feet to the flanks of and above the target, to stop wild shots. The impact point immediately behind the target is cut out vertically, to reduce the number of ricochets.

Targets may be controlled by a cable system operated from the rear by coaches, as in the multiple-lane course, except that rifles and machine guns which deliver overhead fire must be controlled by operators in camouflaged pits nearby. The pits, however, must not be in immediate proximity to the targets at which the patrols will fire.

Rifles delivering overhead fire are clamped into position on permanent rests, as shown in Figure 62. The barrel rest is supported on stakes driven firmly into the ground. The butt rest is securely spiked or bolted to the wall of the

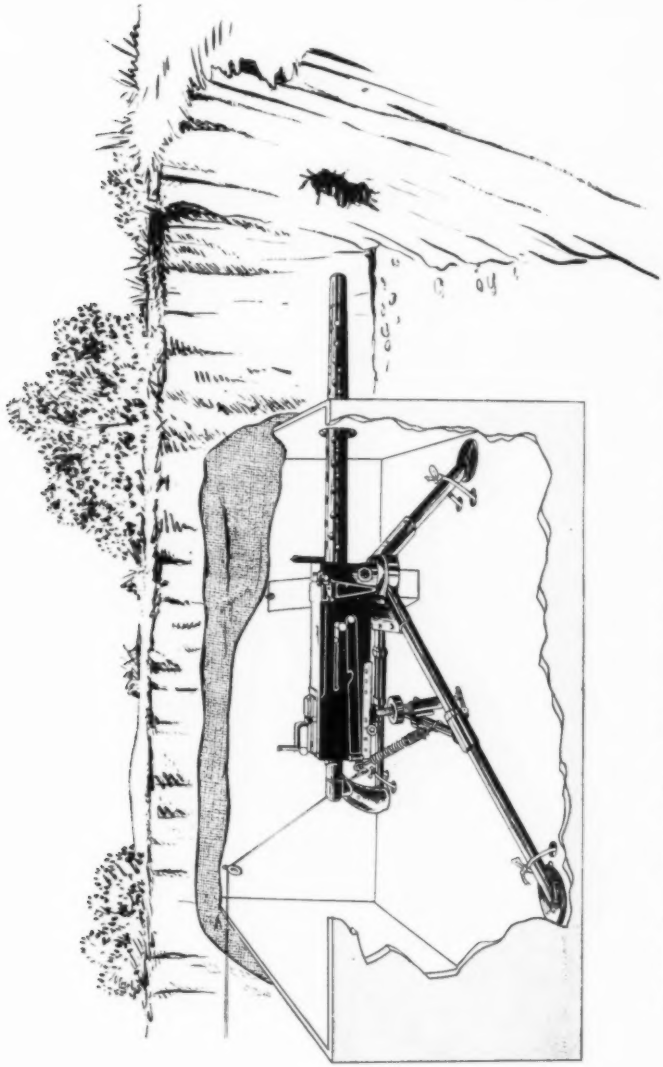

FIGURE 59.—Light machine gun mounted in enclosed box and firing ball ammunition at impact point immediately before muzzle.

operator's pit. When first installed, and at intervals subsequently, the rests are carefully checked to insure that the pits have not settled with a resultant alteration in the

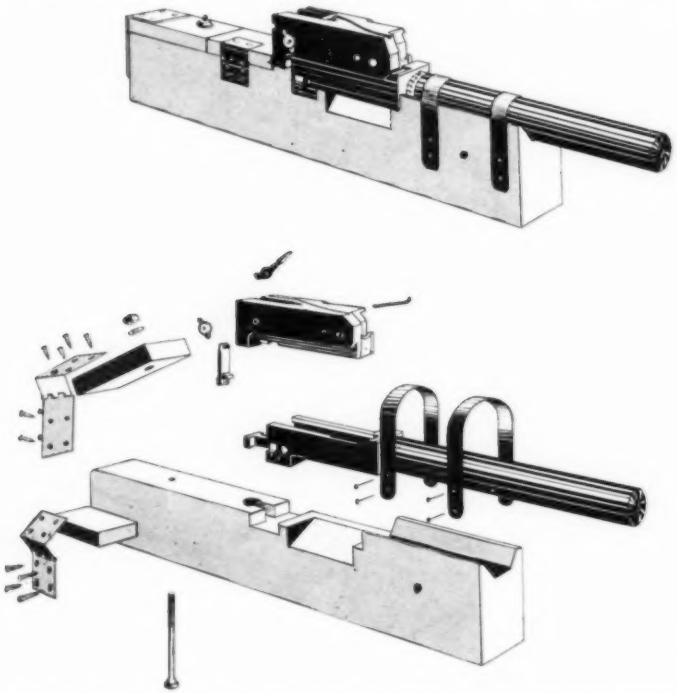

FIGURE 60.—Blank-firing device using worn-out machine-gun barrel and bolt, recommended where equipment cannot be protected from damage on the course. Device is fired by remote-control wire with ring slipped over cocking lever. Tension on wire pulls cocking lever to rear and fires blank cartridge. Hinged block on mount holds bolt forward after loading. Forward projection on sear is filed off, permitting firing without use of trigger. Cocking-lever pin is replaced by improvised pin from ammunition box, held in place by wing nut.

alinement of the rifles. All rifles are sighted into impact points which have been cut into banks of earth. Vertical back walls and sides on the impact points help prevent ricochets. A white spotter target set in each impact point aids the operator in alining his sights.

Machine guns (the M1919A4 is ordinarily used) which deliver overhead fire are mounted on fixed bases to which the tripod legs are fastened with rope. Each barrel rests in a permanent H frame, having predetermined traverse and depression limits.

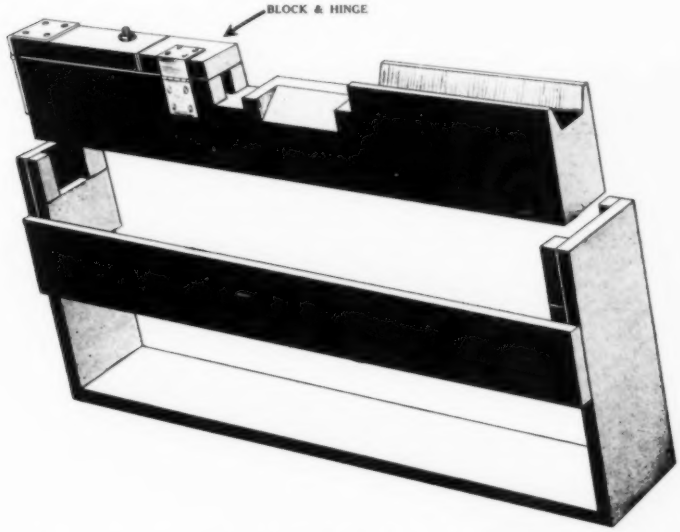

FIGURE 61.—Mount for blank-firing device shown in Figure 60.

Operators' pits are of wood-frame construction 3½ by 4½ feet on the ground, and 6½ feet deep. They are covered by sloping roofs (see fig. 62). Drainage, to carry off ground seepage as well as rain water, should be installed. This is not only for the comfort, but also for the safety of the operators. If there is standing water in his pit, an operator is constantly tempted to stay out of the pit and consequently may fail to keep under proper cover while there is firing on the course. Pits are located with a view to easy camouflage. A soldier on the course may, in excitement, forget his instructions and fire at an installation which he suddenly detects, or at the smoke or dust kick from an operator's weapon, instead of at the targets presented for him.

Following is a series of situations suggested primarily for use on a multiple-lane course. They might equally well be used on a single-lane course, in combination with some overhead-fire stations. The situations may be varied widely to suit the available terrain and construction materials. The Army Ground Forces directive governing establishment of the course merely requires the use of a live fragmentation grenade at one or more stations and the application of all the fire power of the patrol at one or more additional stations.

Action	*A Solution*
Lone enemy in foxhole fires on patrol.	Men who see target fire quickly and take cover. Others take cover, search for target, and fire when they locate it. Patrol continues its advance.
Machine gun in emplacement opens fire on patrol.	All take cover and return fire. Leader directs one man to throw grenade. Immediately after grenade explodes, one man, covered by his buddy, rushes emplacement with bayonet. Remaining men provide cover to front and flanks. Patrol searches area and continues its advance.
Single enemy fires on patrol and runs away. (See fig. 63.)	All men who see target fire quickly and take cover. Patrol searches area and continues its advance.
Enemy in house fires on patrol. (See figs. 64 and 65.)	Patrol takes cover and returns fire. Leader directs one man to flank position and throw grenade. Immediately after explosion, one man, covered by his buddy, rushes house with bayonet. Other men provide cover to front and flanks. Patrol searches area and continues its advance.
Two enemy in foxholes fire on patrol.	Men who see target fire quickly; all take cover. Patrol searches area and continues its advance.

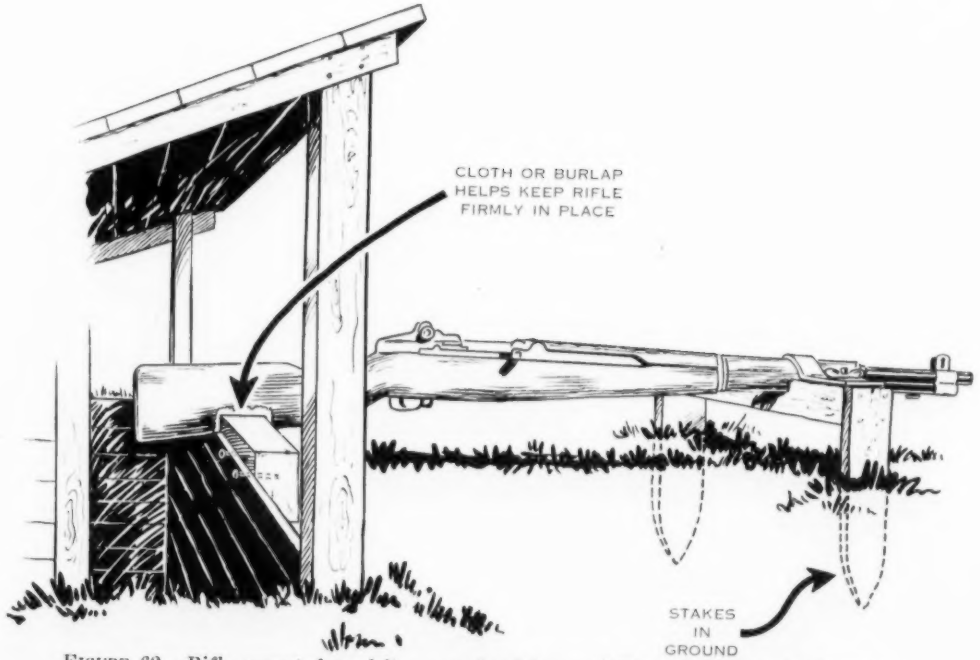

FIGURE 62.—Rifle mounted to deliver overhead "enemy" fire against patrols. Operator in covered pit at left fires rifle and controls targets at station.

Action	*A Solution*
Machine gun in pillbox fires on patrol. (See fig. 66.)	Patrol takes cover and returns fire. Leader directs one man to flank position and throw grenade. Immediately after explosion, one man, covered by his buddy, rushes with bayonet and forces entrance to pillbox. Other men provide cover to front and flanks. Patrol searches area and continues its advance.
Two enemy in ditch fire on leading members of patrol as they cross gully on a log. (See fig. 67.)	Men who see targets fire quickly. Lead men complete crossing rapidly, take cover, and protect crossing of remaining men. Patrol searches area and continues its advance.
Enemy in foxhole fires on patrol. Immediately afterward, two more enemy fire from foxholes to flank of first enemy and at slightly greater range.	Men who see first target fire quickly, take cover, and fire on new targets when they appear. Patrol searches area and continues its advance.
Five enemy behind log fence fire on patrol. (Targets remain up until satisfactory volume of fire is developed.)	Patrol works its way to good firing positions and returns fire until targets disappear. Patrol searches area and continues its advance.
Two enemy appear from behind trees and fire on patrol. (See fig. 68.)	Men who see targets fire quickly and take cover. Patrol searches area and continues its advance.
Two enemy in trees fire on patrol.	Patrol fires quickly, takes cover, then searches area and continues its advance.
Six enemy in long trench fire on patrol. (Targets remain up until satisfactory volume of fire is developed.) When assault takes place, four enemy jump up immediately behind trench. (See figs. 69 and 70.)	Patrol works its way to good firing positions and returns fire. Leader directs one man to flank position and throw grenade. Remaining men sustain fire until grenade explodes, then rush position with bayonet. Patrol searches area and continues its advance.

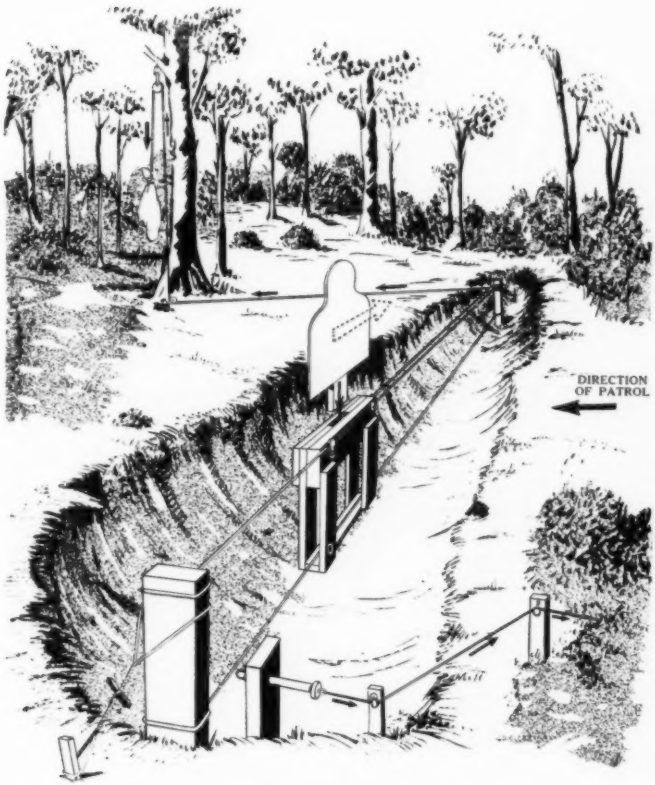

FIGURE 63.—Method of operating target to simulate moving enemy. Large pin in foreground fits in hole in target frame when station is set up for operation. When pin is pulled by remote-control wire, sandbag weight suspended from tree is free to drop, causing target to move to far stake. Silhouette targets representing running or crawling enemy may be used. Wires and supports should be kept below ground level in pit to prevent damage.

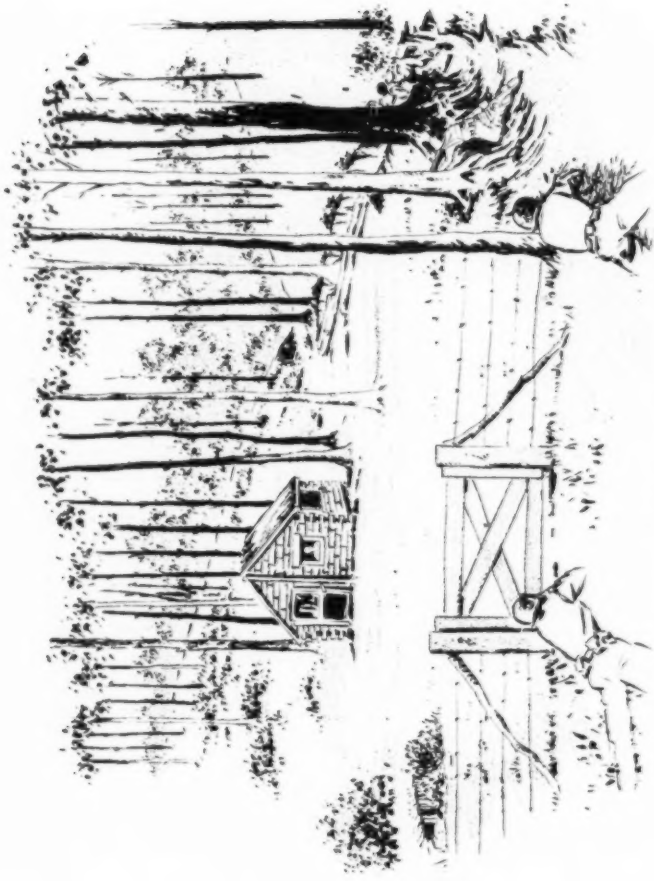

FIGURE 64.—House station, showing target in window. For operation of target, see Figure 65.

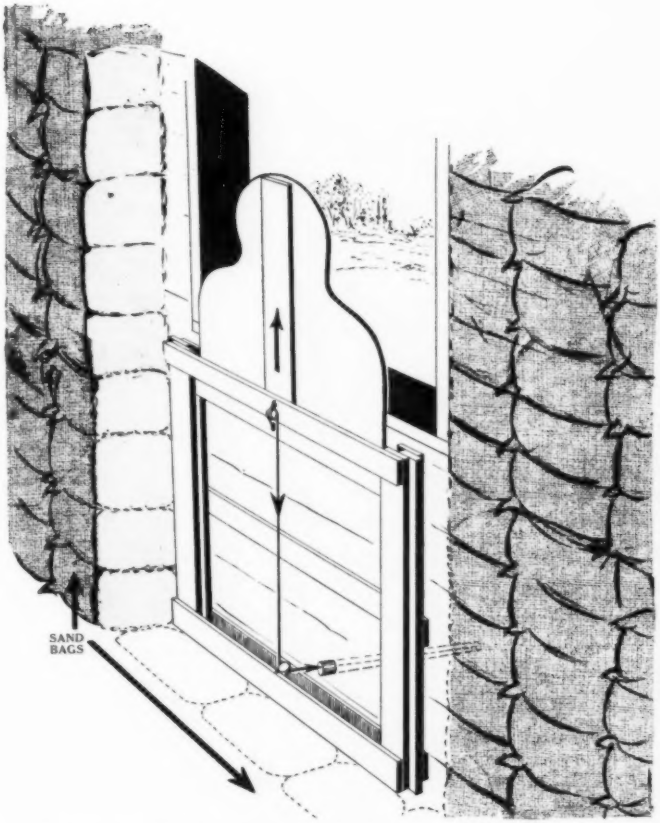

FIGURE 65.—Target in window of house shown in Figure 64 is raised by remote-control wire entering through pipe below ground level. Sandbag reinforcement to reduce damage to house extends completely across window in back of target frame. This type of frame may also be set in a foxhole and operated in the same manner to simulate an enemy rifleman in a spider hole.

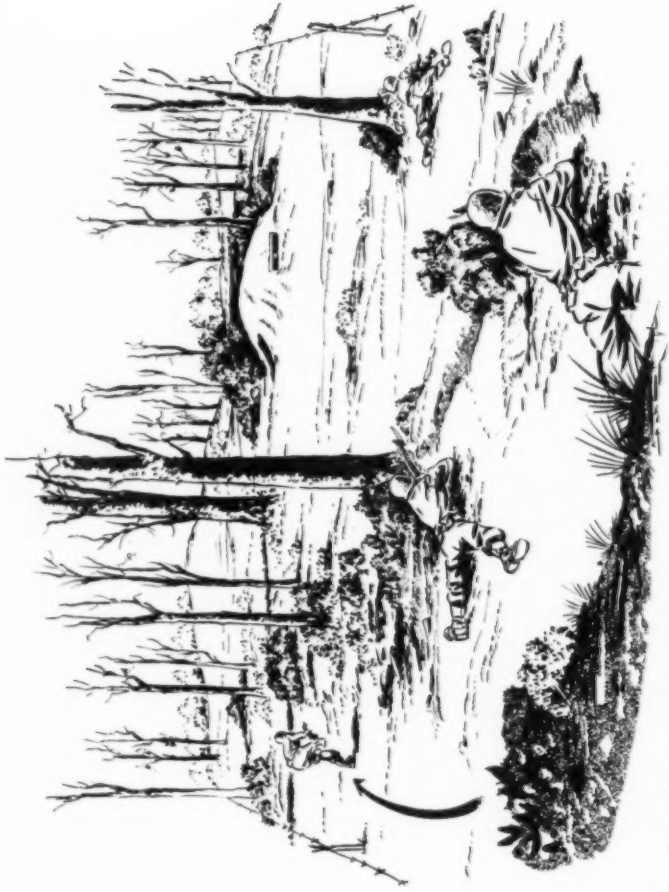

FIGURE 66.—General arrangement of pillbox station. Fire from pillbox may be simulated by blank-firing device (fig. 60) or by machine gun in a protected position in rear of the pillbox, either set up as in Figure 59 to fire ball ammunition or fitted with standard blank-firing attachment.

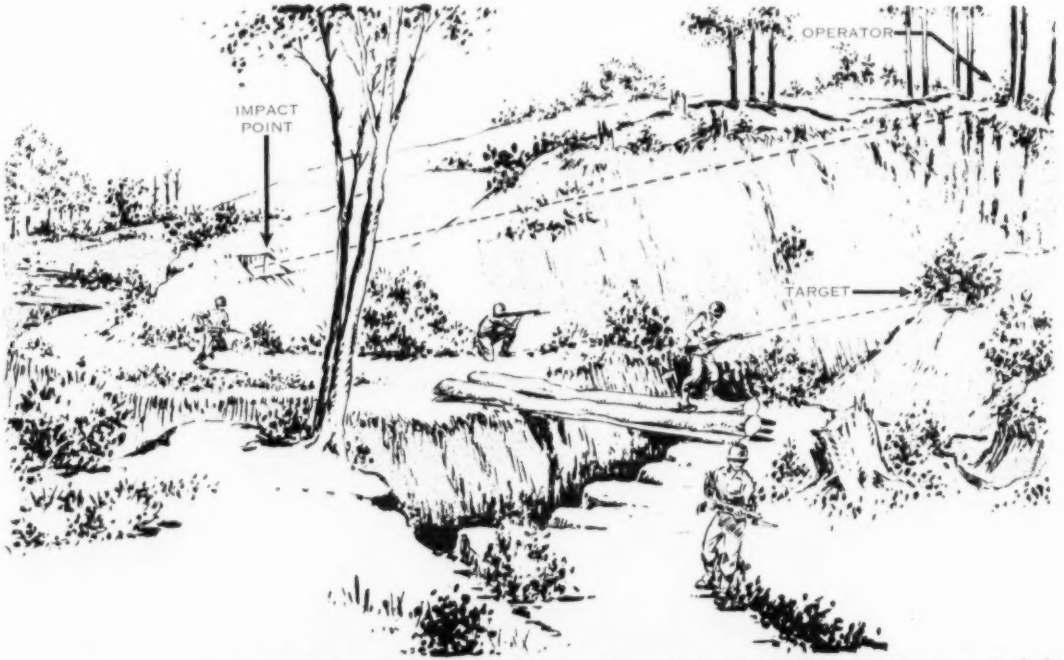

FIGURE 67.—Log-crossing station, showing how it might be set up as an overhead-fire station on a single-lane course if terrain permits.

Figure 71 is a diagrammatic picture of two stations on a multiple-lane course, showing the method of operating both a set of targets and one or more blank firing devices by means of a single control wire. The same method of target control may be used on a single-lane course, except at overhead-fire stations.

Figure 72 is an overhead-fire station suitable for a single-lane course.

On both types of courses, some stations should present surprise targets without "enemy" fire or other attention-attracting devices, in order to test the patrols' alertness. A further test of alertness is obtained by installing booby traps at one or more points on the course. These may vary from a simple trip wire across the lane which, when pulled, ignites a fuze lighter attached to a firecracker (see fig. 73), to the more elaborate installations shown in Figures 74, 75, and 76.

Figures 74 and 75 illustrate a method of booby-trapping a bridge. A salute is detonated by the action of a tilting section of the floor if the soldier makes the mistake of attempting to use the bridge without investigating it. If the stream bed spanned by the bridge is dry, a trip-wire booby trap below the bridge will call for additional alertness on the part of the soldier who may have been wary enough to avoid crossing the bridge itself.

Figure 76 shows another booby trap, in which the opening of a gate detonates an explosive charge placed in a pit a safe distance from the gate.

Demolition charges to simulate artillery fire or other explosions may be introduced at certain stations. These may be detonated by a coach or station operator, or automatically, as in the gate booby trap shown in Figure 76. The improvised switchboard shown in Figure 77 is recommended for the electrical detonation of explosives. It may be built from an offensive grenade box. There are two battery posts of heavy galvanized-iron sheeting, with terminal wires

soldered to the posts to build up contact points. The circuit is completed by closing a knife switch. All demolition wires should be buried about eight inches underground, to prevent cutting by fire on the course.

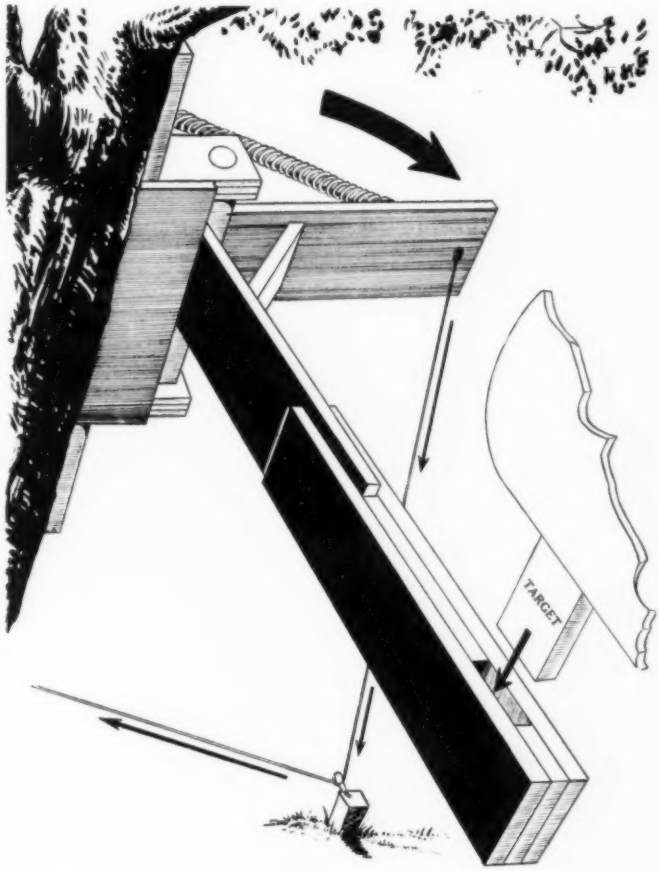

FIGURE 68.—Frame for swinging target attached to tree. When tension in control wire is released, spring retracts frame and target to original position behind tree.

SIG. 9

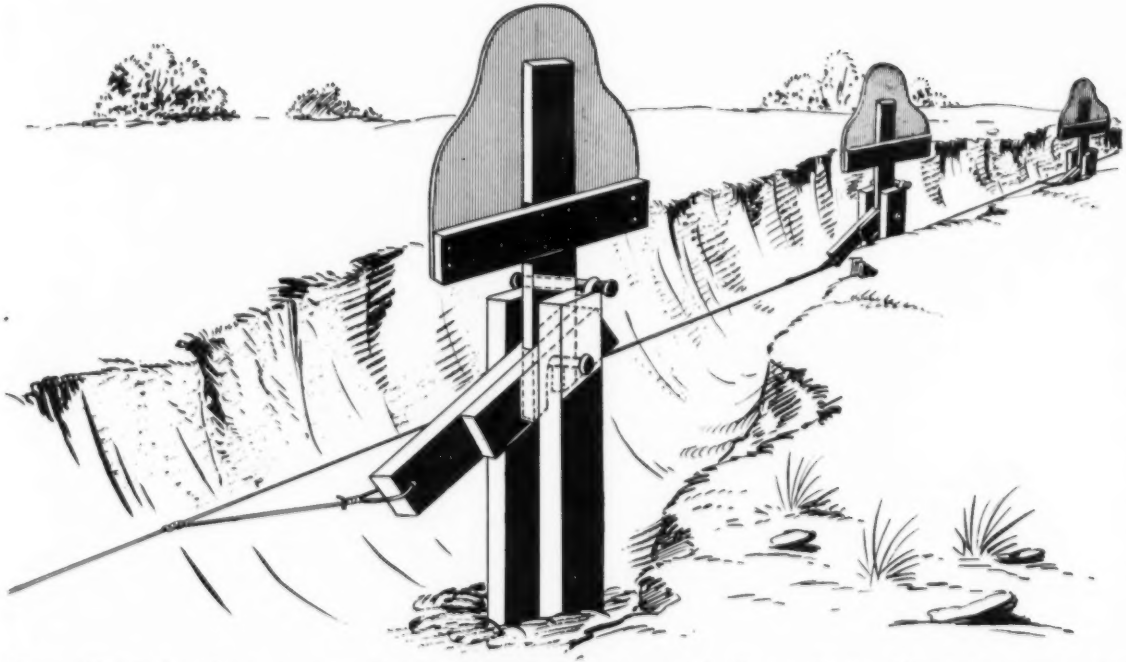

FIGURE 69.—Series of targets operated by single control wire in trench. Target fits in oblique slot in crossarm. Crossarm and target remain in position as shownonly while tension is maintained in control wire. When tension is relaxed, target drops out of sight in trench. Control wires and other apparatus must be well below top of trench to avoid damage by fire.

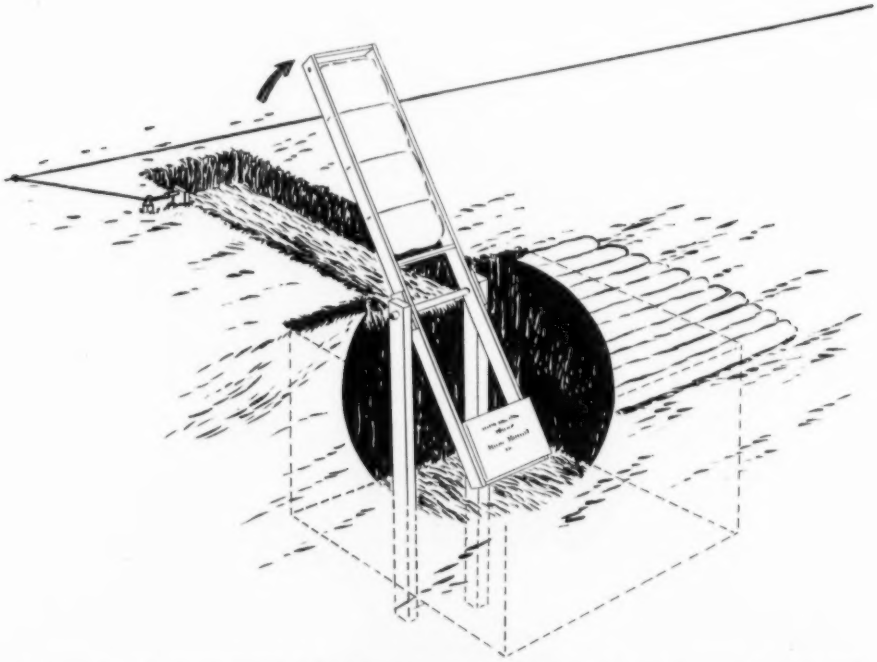

FIGURE 70.—Bayonet target is held horizontal in shallow pit by pin through hole in end of target frame (near arrow). When pin is pulled by remote-control wire, weighted lower end of frame (ammunition box filled with stones or dirt) causes frame and target to pivot to upright position. Deep pit is covered with logs topped by sod. A Japanese or German silhouette may be tacked to front of frame to add realism. Upright framework should be heavy logs or 4-by-4 pieces. Target frame should be of 2-by-4 construction.

METHOD OF OPERATION

The course should be run by four-man groups, in which two men at all times cover the advance of the other pair. (An automatic-rifle team of three men should run the course as a unit, but, with this exception, for training purposes, the four-man group is recommended.) The group may be considered as a small combat patrol or as the point group of a 12-man patrol formation (fig. 47, page 110, FM 21-75). The patrol leader controls the fire of the group and directs the action of all members as the situation requires. Positions of individuals in the group are rotated so that each man will have experience as patrol leader.

An orientation talk before commencing the course familiarizes the men with the procedure, including safety regulations, to be followed, and informs them of what is expected of them on the course. In addition, a demonstration patrol should run through the action on three or four stations to furnish additional guidance.

The members of each patrol are issued sufficient ammunition for the entire course (ordinarily two or three clips). The number of grenades issued depends on the number of stations at which their use is required. The men fix bayonets, lock and load their rifles. Thereafter, they reload individually as necessary.

A patrol leader, an assistant leader, and two flank men are designated in each group. The leader and assistant advance first, while each flank man covers his own front and that of his buddy. When the lead men have advanced to a point where they mask the covering fire, they halt, and the patrol leader signals the flank men forward, while he and the assistant cover this movement. When the flank men reach the vicinity of the lead man, the patrol leader halts them, and the original maneuver is repeated. This procedure is followed throughout the course, varied only as the patrol leader may direct in order to attack an enemy installation. An assault should usually be made by not more than two men, with the remaining members of the group covering them.

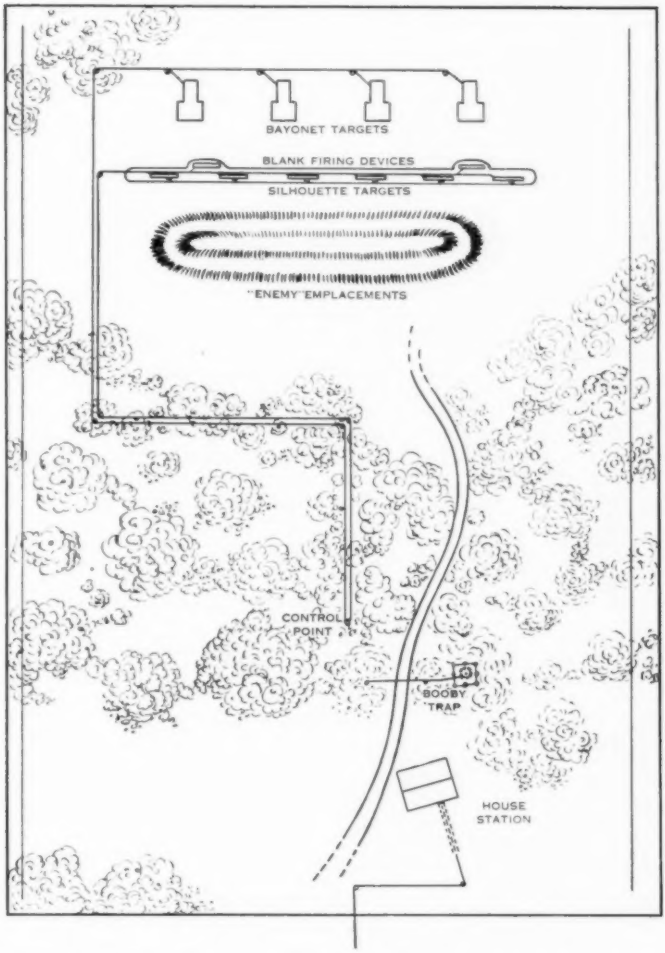

FIGURE 71.—Sketch of two stations on course. The house station at lower right is the one shown in Figure 64. The silhouette targets are of the type shown in Figure 69, the bayonet targets are shown in Figure 70. A single control wire operates both the silhouette targets and the blank-firing devices. The booby trap is a simple trip wire leading to an explosive charge in a pit.

Before running the course, the men are instructed in the technique of quick aimed fire. The soldier should be able to bring his rifle to his shoulder, aim, and fire in a split second, flipping the safety off with the back of his index finger as he brings the rifle to position. He should learn to fire such a quickly aimed shot at the enemy to pin him down *before* taking cover; then to move to a better, covered firing position, if necessary, to deliver accurately aimed fire at the enemy. His failure to follow this procedure when fired on may enable the enemy to fire a second or third round at the soldier or his buddy before any return fire is brought to bear on him.

A coach follows each patrol and operates the targets (except targets at overhead-fire stations on a single-lane course) from the rear. He does not intervene in the actions of the patrol except to insure the safety of all personnel. However, he must observe the operations of the patrol carefully and be prepared to critique them after the completion of the course. On a multiple-lane course, the coach may also control, in general, the rate of progress of the patrol. For example, in preference to halting the patrol to prevent it from progressing too far ahead of groups on adjacent lanes, he may re-expose targets, thereby prolonging the action at one or more stations.

INDIVIDUAL REACTIONS

The soldier's mental attitude, the degree in which he is psychologically prepared for combat, is a major factor affecting his reactions on a close-combat course. The insufficiently prepared soldier tends to be keyed up and nervous. Although his reactions may be quick, his self-control is usually poor, and his judgment unsound. The well-prepared soldier, on the other hand, is calm, confident, and intelligently aggressive.

Between these two extremes, individuals react with infinite variety. Some who exhibit nervousness at the outset, because they are uncertain of what to expect, gain composure and acquire confidence as they progress through

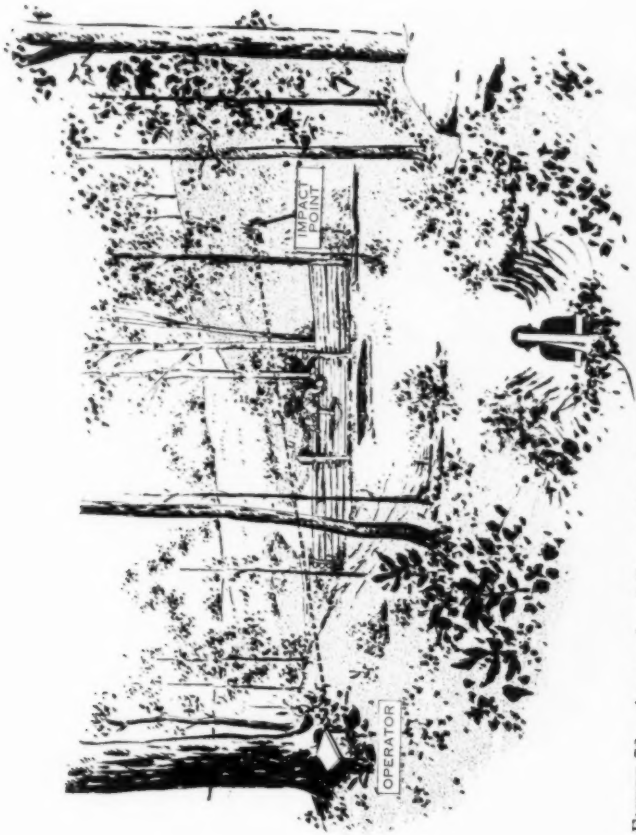

FIGURE 72.—An overhead-fire station. Operator in camouflaged pit at left fires rifle at impact point as first member of patrol crosses fence. Operator raises target in foreground as he fires, then takes cover in his pit.

the course. For these men, the close-combat course is performing with maximum effectiveness its function of preparing them for combat.

FIGURE 73.—When wire is pulled, fuze lighter ignites, detonating firecracker.

The course is a good test of the individual because it stimulates most soldiers to do their best. The knowledge that his individual fighting ability is challenged brings forth the utmost efforts of the average man. The fact that skillful handling of weapons is required of him is an additional stimulus, because even the inexperienced soldier rapidly develops pride in his use of arms. It is unusual to find an indifferent or apathetic soldier on the close-combat course.

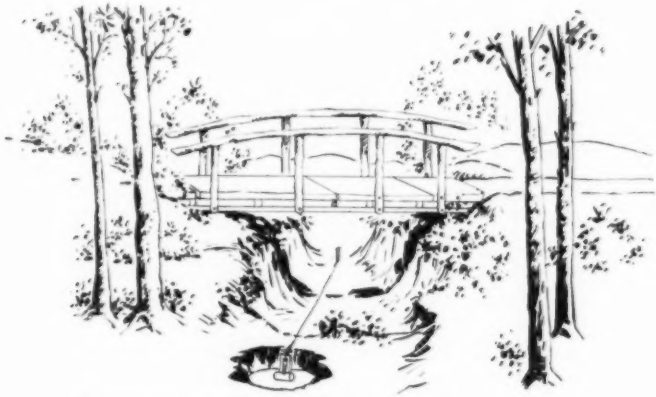

FIGURE 74.—Booby-trapped bridge and stream bed.

Although his unit is small, the patrol leader definitely demonstrates his leadership ability on the patrol close-combat course. His control of the movements of the patrol, his estimates of the various situations, and his orders to subordinate members of the patrol require leadership. Therefore the course affords a unit commander an excellent

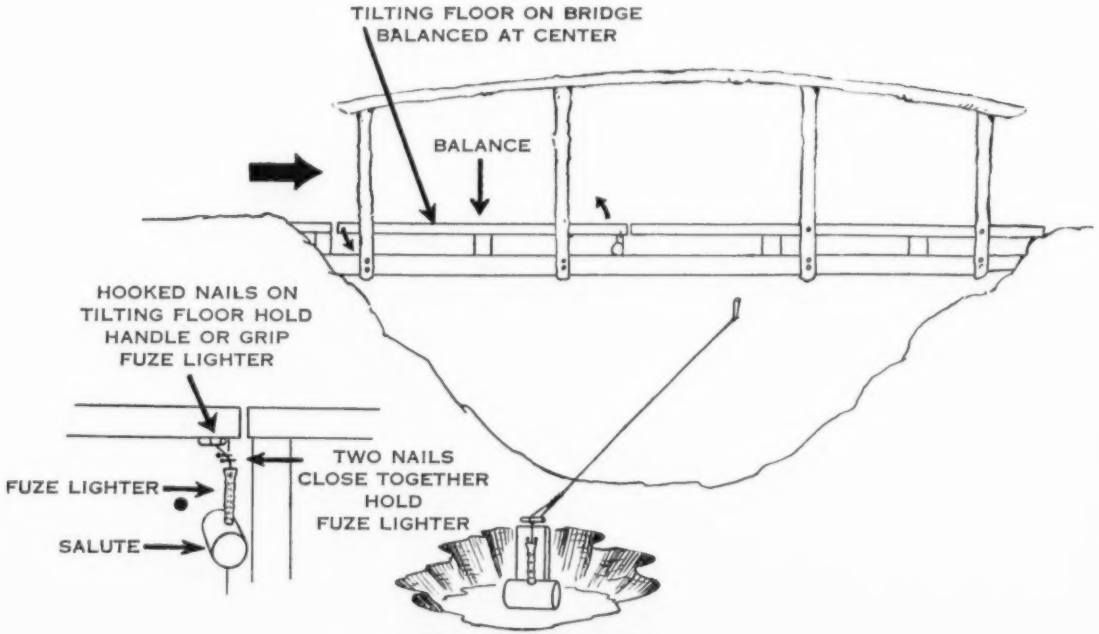

FIGURE 75.—Details of bridge booby trap.

opportunity to test his noncommissioned officers and potential noncommissioned officers for qualities of leadership and for ability to cope with minor tactical situations. It gives the noncommissioned officers practical work in techniques which can be applied to many situations in combat.

A man who has had little training in the practical application of range work will make some mistakes on the close-combat course solely as a result of insufficient experience in the use of his weapons, even though his mental reactions on the course may be excellent. A soldier with a considerable military background may be expected to react correctly, from a mechanical point of view, most of the time.

Coaches and instructors must be able to evaluate failures and mistakes made on the course. They must attempt to calm the excitable soldier who tends to be "trigger happy." They must be able to critique each action or series of actions, to point out why a solution may have been wrong and why another suggested solution might have been preferable. It is important to distinguish between mistakes due to anxiety, to inexperience, to fatigue, or to a physical handicap. If a rating or scoring system is used to measure team proficiency on the course, there should be an estimate of the cause of unsatisfactory performances. Since individuals may make identical errors for entirely different reasons, a rating sheet will be of limited value in correcting training failures if it is unaccompanied by any explanation of the failures.

SAFETY REGULATIONS

All men running the course are thoroughly instructed in the safety precautions to be observed. The chief of these are: To keep rifles locked except when actually firing. To be certain no teammate is endangered by another man's fire. To refrain from firing at a target except to the front (or flank, on a single-lane course). To avoid unexpected movements which might cross a teammate's line of fire. To give a warning shout before throwing a grenade. To take cover instantly on hearing a grenade warning. To

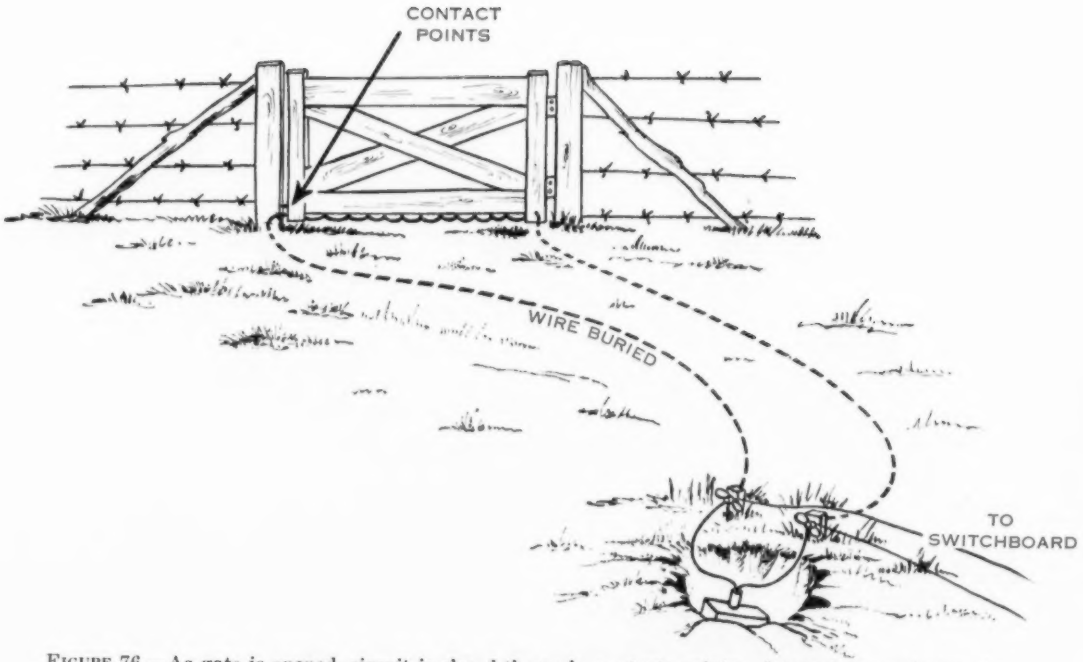

FIGURE 76.—As gate is opened, circuit is closed through contact points, detonating explosive in pit. Battery supplying spark is in switchboard (fig. 77).

cease fire immediately and lock rifles at a coach's command, "Out of action." To throw a fragmentation grenade only when instructed to do so by a coach.

Coaches must instantly order a man out of action at any time that his fire might endanger personnel on the course. A coach will ascertain that all personnel have taken cover before a grenade is thrown.

If a grenade appears to be a dud, the coach calls, "Out of action," takes the group to the next station, and notifies the officer in charge of the location of the grenade.

Officers in charge must assure themselves that coaches and station operators are thoroughly familiar with their jobs. When a new man is assigned to one of these positions, it is desirable that an experienced man remain with him until the new man is capable of working alone. However, officers in charge should frequently question all personnel on their operating procedure and safety regulations.

A fixed procedure for placing charges at all electrically operated demolition stations is followed: 1. Open the switch. 2. Remove the battery. 3. Place the battery in a hip pocket. 4. Insert the blasting cap in the explosive. 5. Check the pocket to make sure that the battery is in it and has not been left in the switchboard. 6. Connect the blasting-cap wires to the switchboard wires. 7. Replace the battery in the switchboard. 8. Close the switch (on booby-trap stations only where there is another break in the circuit at the booby trap).

Before operation of the course, an officer checks the circuits at each demolition station with a galvanometer to insure that no short circuit exists. At the approach of an electrical storm, these stations are ordered out of action, because of the possibility of premature detonation of a charge.

A noncommissioned officer makes a daily check of the telephone system, if one is used, to insure that it is in working order.

To reload the blank firing devices (fig. 60), the following procedure is used: 1. Turn bolt-retaining block (hinged to side of frame) out of the way. 2. Pull bolt back against wooden stop. 3. Push cocking lever to forward position. 4. Place left hand over bolt, holding cocking lever forward with palm of hand. 5. Insert blank in T-slot with right hand. 6. Adjust blank in T-slot with thumb over and two or three fingers under cartridge (fingers are brought up under the barrel extension through the beveled opening in the mount). 7. Guide cartridge into chamber. 8. Push bolt forward and replace bolt-retaining block in position to rear of bolt. 9. Place trip ring over cocking lever.

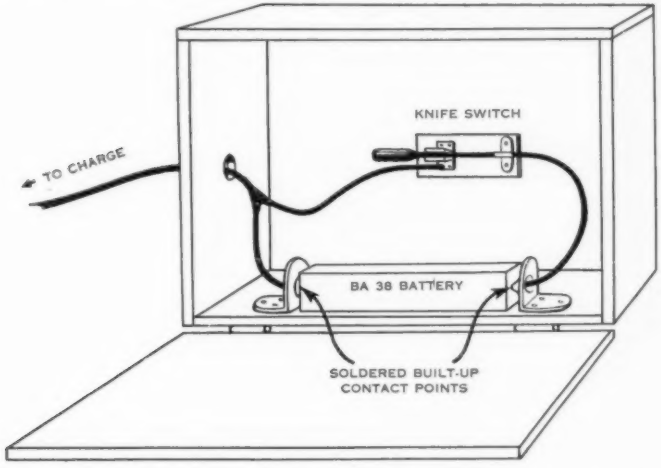

FIGURE 77.—Switchboard for electrical detonation of explosives.

At the end of operations for the day or prior to an extended break, all weapons on the course are cleared, in the presence of an officer in charge, by running a rod through the barrel.

Multiple-lane course

As the arrangement of the course may require, the advance of patrols in the various lanes is coordinated by instructors operating in the intervals between lanes, in such

a manner that no patrol is endangered by the fire of a patrol in another lane. The coaches assist in this coordination. For the purpose of gauging movement on the course, one lane is designated as the base lane.

Single-lane course

Operating rules and safety regulations applying to each overhead-fire station are typed on a card, which is mounted on masonite, varnished, and posted in the operator's pit at the station as a constant reference and reminder for the operator.

Each operator is responsible for keeping the installations at his station properly camouflaged at all times, and the officer in charge, before each day's firing, makes an inspection to insure that this requirement has been met.

An officer in charge requires the operator of each overhead-fire station to fire one or more rounds from his weapon, while the officer observes the strike of the bullets in the impact area before operation of the course each day, in order to insure that the weapon is properly placed and sighted.

Operators of overhead-fire stations must aline the sights of their weapons at the impact point at the moment of firing. Immediately after the raising of the target and the subsequent firing, the operator drops to the bottom of his pit and remains there until the action at the station has been completed.

OPERATING PERSONNEL

One officer in charge. He is responsible for preparation of the course for use, for instruction of all operating personnel, and for procurement of equipment and supplies of all kinds. He normally gives the orientation to each group prior to commencing the course.

One or more control officers. At least one control officer (depending on the number of lanes) assists the officer in charge in controlling the movement of the patrols through the course. Two sets of control officers, if available, save time on the course, as a patrol can be organized, ready to

move out, before the officer with the preceding group returns to the starting point. On a long single-lane course, it may be advisable to divide the course into sections, or legs, with a control officer in charge of each.

Two noncommissioned officers (coaches) and two reloaders per lane. One coach and one reloader follow each patrol. The reloader sets up the course for the next patrol as soon as each station has been completed. He reloads blank firing devices, rearms booby traps, and places demolition charges. At completion of the course, the coach, the reloader, and the patrol clear the course immediately to avoid delaying the start of the next patrol.

Telephone operators. The number of operators depends entirely on the layout of the course. If access to the course is possible only through the firing area, telephones at road blocks and at the starting line of the course facilitate rapid clearance for personnel moving in and out of the area. On a single-lane course, a system of telephoned clearances between key points may permit more than one patrol to operate on the course at a time. In any case, telephonic communication between the starting point and finishing line eliminates delay in starting succeeding patrols.

Permanent maintenance detail. One man per two lanes is needed to repair targets, rebuild damaged installations, and perform other work required to keep the course in good operating order.

Station operators. One experienced man is required at each station at which overhead fire is delivered. He operates both the weapon and the targets from a concealed pit.

CHAPTER 16

Blackboard Drawings

Some of you gentlemen (said the instructor in Aids to Training) have expressed consternation at the suggestion that you illustrate your blackboard talks with chalk drawings. I understand how you feel—I am no artist and I once felt the same way when it was suggested that I produce drawings in front of a class. But I am going to try to show you that you need not be an artist to make understandable and useful blackboard drawings.

In the first place, an elaborate drawing on a blackboard, assuming you were able to make one, would not be worth the trouble it would require. A blackboard is merely a graphic auxiliary to a conference; it is not a suitable place for works of art. Blackboard drawings should be hasty sketches, so hasty, in most cases, that they can be made more rapidly than the phrase for which they substitute can be written.

For example, if I have on my blackboard a rough map or terrain sketch and wish to locate an aircraft-warning station on it, it would take me at least 15 seconds to write out "Aircraft Warning Station." So, instead, I take 10 seconds to make this drawing:

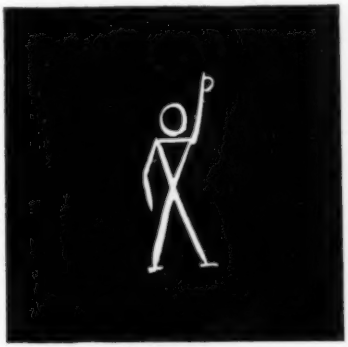

FIGURE 78.

An informal symbol like this has another advantage in addition to the speed with which it can be made. Even though it may cause some amusement, it will keep your class awake, wondering what the next sketch will be. And, so long as you remember to point out what the picture represents, it will help to drive home a point of instruction.

I am not going to attempt to give you a capsule course in drawing. FM 21-35, the Field Service Pocketbook on Sketching, goes about as far in that direction as is wise. However, I do want to point out to you one thing about panoramic sketching which is handy to know and which is not elaborated on in that manual.

Woods at a distance appear different from woods nearby. If you want to draw on your blackboard some woods in the immediate foreground, do it something like this:

FIGURE 79.

There is nothing hard about it. Simply scribble along the sides and top, draw in some wiggling lines in the middle, and add a few tree trunks and limbs.

For woods farther off, follow the same procedure but make the outlines more regular, like this:

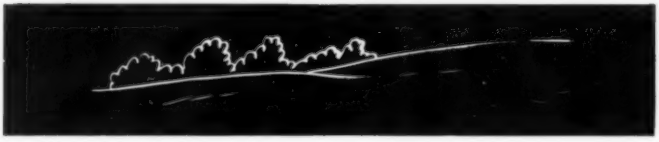

FIGURE 80.

And for woods very far in the distance, make the outline still more regular and leave out the trunks and branches altogether, like this:

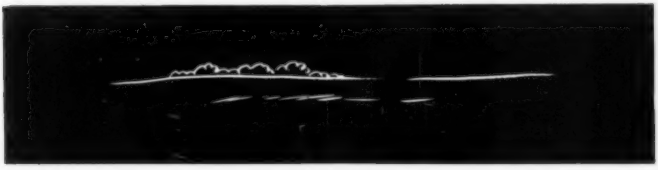

FIGURE 81.

I mention this aspect of blackboard drawing because it is really much simpler to make a drawing of a piece of terrain than you might think, and panoramic sketches can be extremely useful. Some situations can be shown much more clearly by a panoramic sketch than by a map. Here, for instance, is a rough map alongside a panoramic sketch of the same terrain. The important point is that the rifleman on HILL A cannot see into the draw to his front. The map does not show this plainly. But, from the panoramic sketch, the fact is immediately apparent.

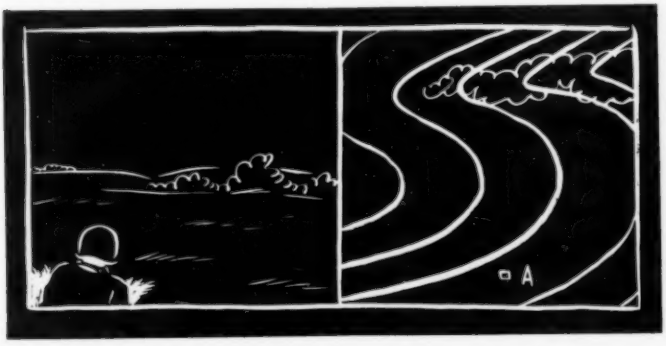

FIGURE 82.

To get back, now, to the symbols we were discussing. The first thing to do is to learn a few basic figures so that you can draw them without making erasures and corrections. Keep them simple; detail is an unnecessary waste of time. You might, for example, draw a jeep in this manner:

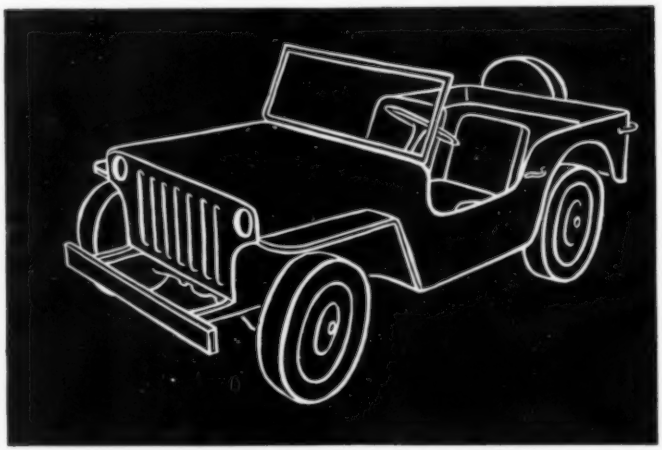

FIGURE 83.

Then, when it was all finished, you could turn away from the blackboard, wake up the class, and announce that it was time for a 10-minute break. And, in spite of the effort you had put into it, your picture would not be as good for its purpose as a little box with big wheels and a high windshield which anybody can draw in about 5 seconds.

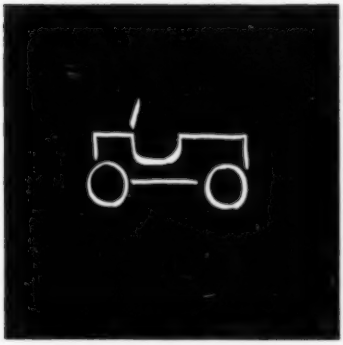

FIGURE 84.

A jeep is a good thing to practice your blackboard drawing on. You can use it for almost as many purposes in blackboard drawing as you can in the field. Push its top forward while you hold the bottom back, scrawl a cloud of dust behind it, place a driver behind the wheel, and you have a motor messenger or a reconnaissance patrol.

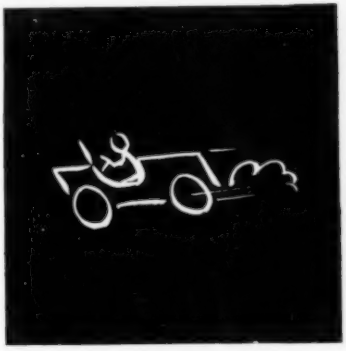

FIGURE 85.

Scatter a lot of jeep symbols, of all sizes, around the board, being careful to indicate that the big ones are closer than the little ones by placing them below the smaller ones, and you have a motor park.

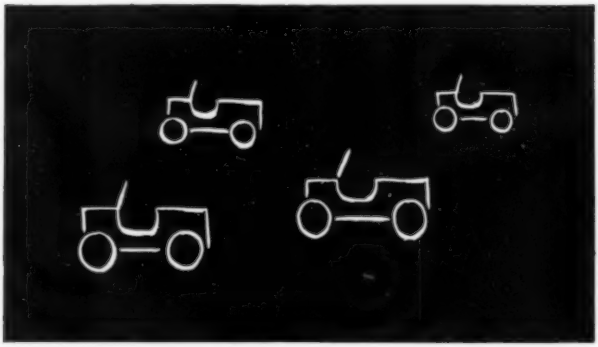

FIGURE 86.

After you have mastered the jeep symbol, learn how to picture a man with a few quick, simple lines. You won't be laughed at for drawing a man this way; probably nobody in your class will be able to do any better. For example, if you want to indicate a sentry, do it like this:

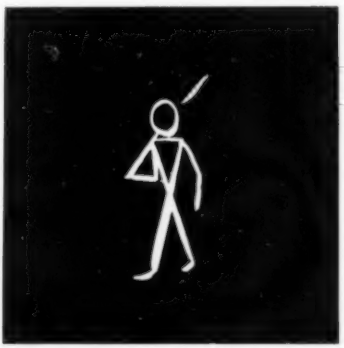

FIGURE 87.

Always remember that your object is to give the class an unmistakable picture of what is going on at a given point on your map or diagram. Consequently, a drawing of a man who is doing nothing does not add to the informative value of your blackboard.

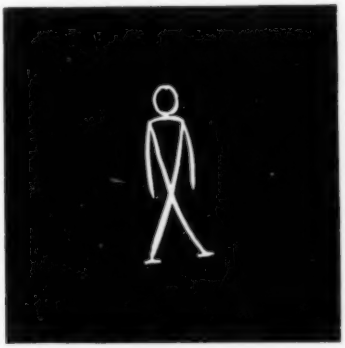

FIGURE 88.

You might tell the class what this man is there for, but five minutes later most of the men will probably have forgotten whether he is a guide,

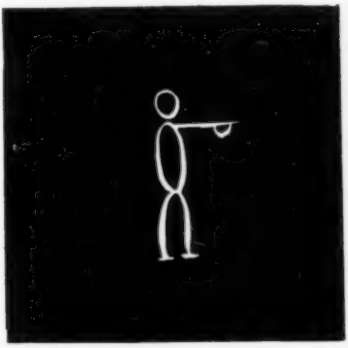

FIGURE 89.

or a company clerk,

FIGURE 90.

or a foot messenger.

FIGURE 91.

The point is that your drawing must tell a story. To insure that it does so, it ought to be rehearsed just as the rest of your instruction is rehearsed. Now and then, you may decide, on the spur of the moment, to put an unrehearsed drawing on the board, just as you may sometimes deviate from the prior plan of your instructional talk. Perhaps your impromptu drawing is not very good. In that case, don't waste a lot of time erasing it and trying to improve it. Leave it alone, laugh at it, tell the class what you were trying to draw, and let the class laugh at it too. The class will derive as satisfactory a lesson from the unsuccessful symbol as from the ones you have practiced to perfection.

Of course, you can't afford to have bungled drawings all over your blackboard. The class would be unable to keep track of them and would rapidly become bored, instead of amused, with your ineptitude. You must rehearse, so that you can draw most of your symbols with ease and get them right on the first try. After a while, you will be able to keep on talking as you draw. That is one of the big advantages of simple blackboard drawings in place of long words or phrases which would otherwise have to be written out. Many an instructor who cannot write one thing while he is saying something else, can, after a little practice, draw a simple picture while he goes on talking.

The talking is important, too. Remember that the symbols, though some of them might be recognizable alone, are not really pictures; you can't expect to put a four-line drawing on the blackboard and have the class know instantly exactly what it is. The exact meaning must be explained; thereafter, the symbol will serve as a reminder to the class.

Symbols like these aren't listed in any manual. Every instructor can work out a set of his own, selected for their usefulness in his subject and the speed with which they can be drawn. Then he works them into his instruction, saying, for example, "At this point, the weapons platoon goes off-carrier and continues forward by hand-carry," and drawing as he says it, this symbol:

FIGURE 92.

Isolated from any sort of context, this figure would mean very little. But, put on the blackboard at the moment that the subject of hand-carry is introduced, it does not require a vivid imagination to recognize it as a member of the weapons platoon carrying two boxes of machine-gun ammunition. The recognition process, coordinating the eye and the memory, does the rest. It is an easier process with symbols like these than with many of our official military symbols. A large black dot, for example, has nothing about it to suggest a squad; however, every soldier rapidly learns that it represents a squad and thereafter always makes the mental association when he sees the symbol.

It is important to design your symbols with the utmost simplicity. Drawings that are exceptionally "clever" or "funny" are also distracting; their instructional value is reduced because the budding artists in the class forget about the instruction and try to copy the pictures. Therefore, concentrate on symbols which you can draw more quickly than you could write the words for which the symbols stand. This will insure that the symbols are simple. Be certain, however, that they are not oversimplified so that they mean too little to the class.

One more point. Symbols such as you have just seen have a great variety of uses. But simple blackboard drawings can be made to add interest, variety, and instructional value

to many subjects in which mere symbols do not have much application. I have already mentioned panoramic sketches. I remember an instructor in communication who made extensive use of the blackboard in his conferences, although, offhand, that subject does not seem to be one to which blackboard drawings would add very much. This instructor's pictures were not quite so simple as most of those I have shown you up to now, but he drew them quickly, probably because he had spent a great deal of time rehearsing. If so, that time was well spent.

In his conference on the history of communication, he told us that the first method of communication was by means of the spoken word. Busying himself at the blackboard as he talked, he remarked that the earliest language consisted of only a few simple sounds made by a cave man in order to inform his wife that he was home from the office, and when would supper be ready? About the time the instructor said this, he turned away from the blackboard and showed us a picture of the cave man in question.

FIGURE 93.

As he was erasing this drawing, the instructor began to talk about the earliest written language. This consisted, he said, of messages and laws chiseled in stone. A moment later, the instructor stepped aside to reveal this drawing:

FIGURE 94.

Subsequently, he used a picture of a dove carrying an olive branch to Noah, during the flood, as the most famous example of the use of a carrier pigeon.

FIGURE 95.

Other historic steps in the history of communication he illustrated by a picture of Phidippides carrying the news of the Battle of Marathon—

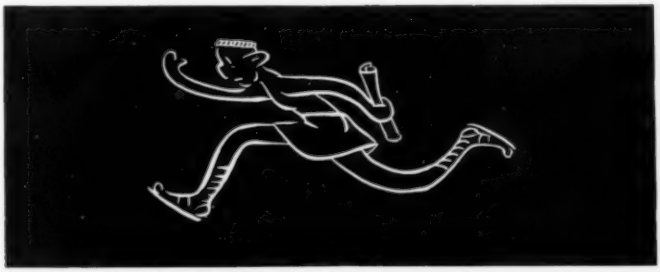

FIGURE 96.

—and a drawing of an Indian making smoke signals with a pipe.

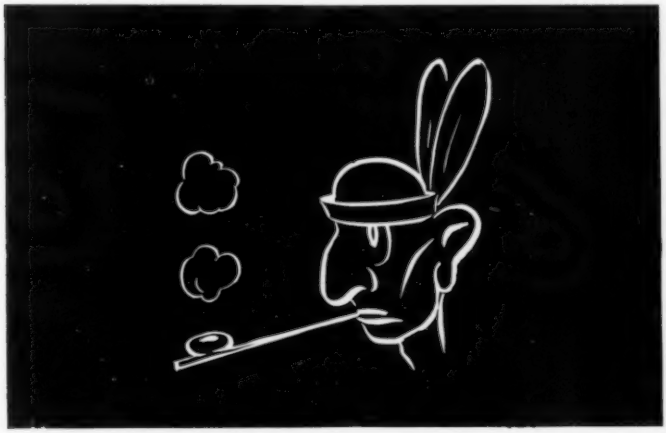

FIGURE 97.

These should give you an idea of the range of blackboard drawings which you might successfully use, requiring, it is true, considerable practice, but very little special skill.

This ends our conference on the subject. While you are taking a break, I suggest that you look at these samples of simple blackboard pictures which I have found useful and which may suggest additional ideas to you for your own classes.

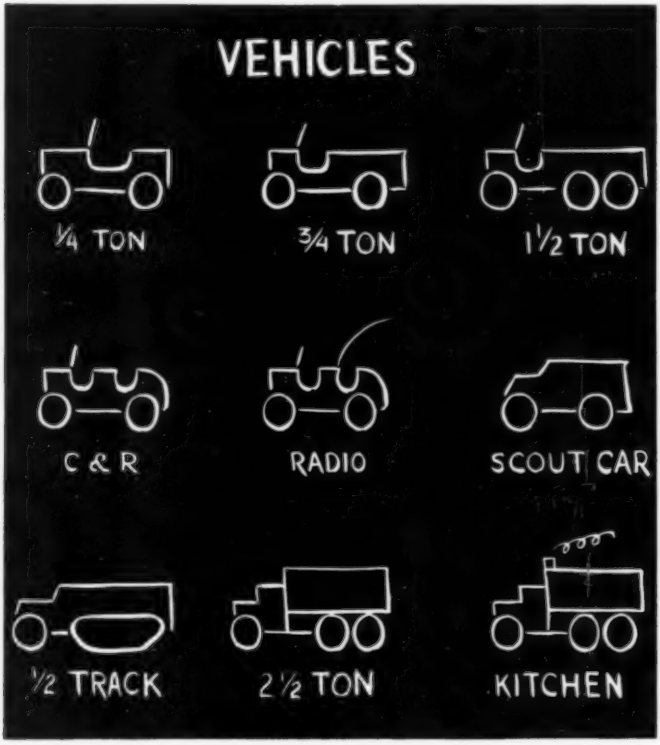

FIGURE 98.

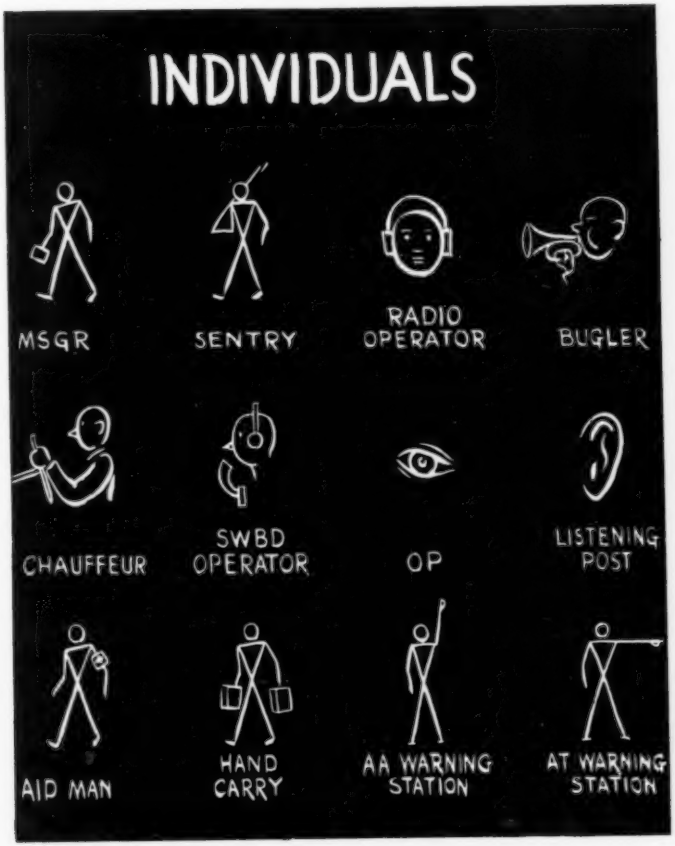
INDIVIDUALS
MSGR
SENTRY
RADIO OPERATOR
BUGLER
CHAUFFEUR
SWBD OPERATOR
OP
LISTENING POST
AID MAN
HAND CARRY
AA WARNING STATION
AT WARNING STATION

FIGURE 99.

ARMORED
LIGHT TANK
MEDIUM TANK
HEAVY TANK
75
105
75MM ASSAULT GUN
105MM ASSAULT GUN
FIRES
LM
LIGHT MG
HM
HEAVY MG
AR
AUTOMATIC RIFLE
R
RIFLE
A
ARTILLERY
M
MORTAR
BOMB
SMOKE
GAS

FIGURE 100.

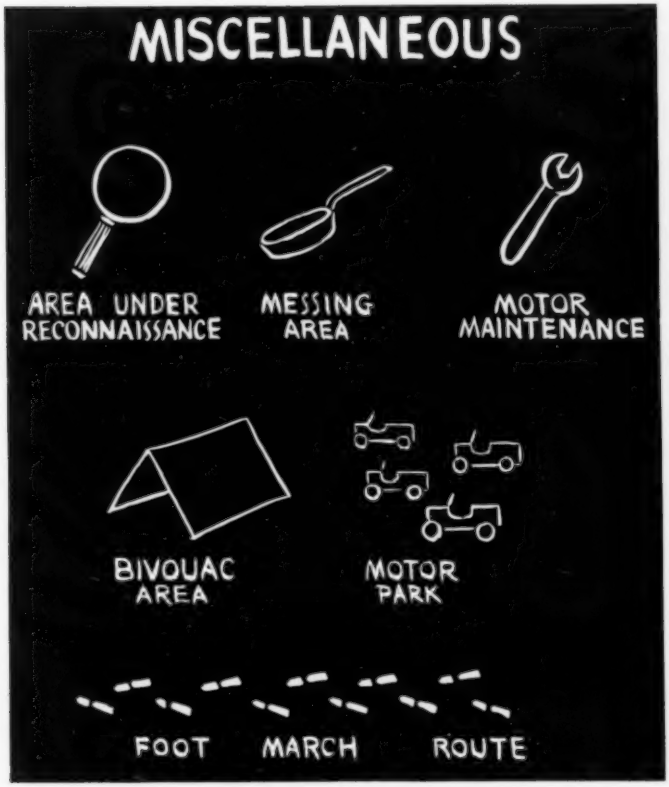
MISCELLANEOUS
AREA UNDER RECONNAISSANCE
MESSING AREA
MOTOR MAINTENANCE
BIVOUAC AREA
MOTOR PARK
FOOT MARCH ROUTE

FIGURE 101.

CHAPTER 17

The Five-Foot Shelf

A good deal of confusion exists in the minds of many junior officers as to what military texts they should study in order to prepare themselves and their men for combat duty. Training schedules cite a seemingly endless number of references, frequently to texts which are readily available in theory, but frequently are not so in fact. Again, the paragraph-number references are frequently overdone, or do not cover to the best advantage the specific item to which they refer. Commanders usually accept without question the schedules drawn up by members of their staffs. Sometimes lack of time may prevent their making even a spot check. If at times it occurs to them that the paragraph and manual references are too extensive, they are apt to subscribe to the old slogan about chapel attendance, "It *can't* hurt, and it *may* help!"

Experience has often shown, however, that too much material sometimes *can* hurt using personnel. There is little enough time right now even for minimum study requirements; if an officer or enlisted instructor has the book thrown at him—and not one book alone, but as many as six or eight in a single day—he is more than likely to compromise by skipping almost all of them and hoping for an inspiration when the hour of instruction arrives.

In the final analysis, it would seem to be an excellent idea to avoid putting out schedules with references to everything but the kitchen stove. If instruction in a phase of scouting and patrolling is scheduled—say, the preliminary duties of a patrol leader—a description of the subject may properly be looked for and offered as a reference in Section II, Chapter 9, FM 21-75. If immediate action and stoppages of the

Browning Automatic Rifle are to be discussed, appropriate information is to be found in paragraphs 38-41, FM 23-15. It is neither necessary nor desirable in the first instance to add a list of paragraphs dealing with control, security, movements, and halts just because they are allied subjects, or, in the second instance, reference material on care and cleaning and range practice. Yet such things are all too often thrown in for good measure. Certainly, everything cannot be covered in a single assignment, or even in many assignments, and to heap such relevant but, at the moment, immaterial data upon the harassed instructor serves more than anything else to obscure the issue and defeat the very purpose of the schedule. This purpose is to present simply a clear guide which will facilitate good military training.

The truth of the above must be so obvious as scarcely to merit discussion, yet, unless the issue is faced squarely, and schedules are rigidly scrutinized, from the highest to the lowest preparing echelons, there is little likelihood that the defects will be properly corrected. Lower agencies will protest that their hands are tied; higher ones, that there is so much to do and so little time available in which to do it, that the attempt must be made to cover the maximum, no matter how. The answer seems to be reiteration in another form of what has already been indicated—that something less than the whole, soundly and thoroughly studied, and, in turn imparted, is of infinitely greater value than a vague smattering of a mass of half-integrated uncertainties.

Whether or not it is conceded that the references should be combed over and related directly to their respective subject material, the fact remains that there will of necessity be a large number of texts—principally field manuals and technical manuals—which must be consulted and studied in conducting a well-rounded training program. Distribution of these manuals, which is indicated on the back of the title leaf, varies widely, according to estimated needs. Some of them will be far more readily available to students than others, necessitating a considerable amount of cooperation and give and take among using personnel.

The following examples of the distribution in infantry regiments of certain typical and widely used manuals illustrate the necessity for such cooperative spirit:

Manual	*Distribution*			
	REGIMENT	BATTALION	ALL COMPANIES	INTERESTED COMPANIES[1]
FM 7-10, Rifle Company	2	2	2	10
FM 7-15, Heavy Weapons Company	3	5		20
FM 7-20, Infantry Battalion	3	25		
FM 7-30, Supply and Evacuation	5	3		15
FM 21-75, Scouting, Patrolling, and Sniping	2	2	10	
FM 22-5, Infantry Drill Regulations	5	5	20	
FM 23-5, U. S. Rifle, Caliber .30, M1	5	5	20	

It will be noted that the allotment varies considerably. There will always be a certain number of personnel who feel that they are not receiving a share commensurate with their needs.

This point is debatable; obviously, there must be a distribution limit. If someone needs a manual, and the allotment of that particular number has been exhausted, he must possess sufficient initiative to find one, and come to a working arrangement with the temporary possessor for its use. By the same token, the latter must be willing to share the volume. To insure an equitable arrangement, some sort of an understanding as to use of manuals should be standing operating procedure in an organization, as well as a time limit for their return. It is not hard to maintain a record of who drew what books, and when. Needless to say, no one should be allowed to monopolize a manual at the expense of his fellows; such a practice, if unchecked, might well in its

[1] Interested companies are those to which the manual is of primary importance.

cumulative effect prove disastrous to the entire command. True, certain aggressive unit leaders who managed to grab and keep overtime a large proportion of the manuals in an organization might well bring their own units to a relatively high state of training, but that of the other units would be likely to develop in inverse ratio to that of the more fortunate ones. It boils down to the old aphorism that a chain is no stronger than its weakest link.

Assuming that everyone cooperates, that all manuals have been passed from hand to hand, and that the training period has been completed, there will still be a number of officers and enlisted men who will wish to have personal copies of one or more field manuals constantly and immediately available for further study or check-up. Such manuals would ordinarily be included in the tactical group, since those of a technical nature should have been mastered during the training period. Exceptions would be those dealing with motor vehicles, and such weapon manuals as might have to be consulted for firing data, methods, and tables.

For commanders provided with vehicles, the consulting of appropriate manuals presents no problem, as a great many can be readily transported and be on hand when needed. Vehicles are provided for regimental, battalion, service, antitank, and cannon company commanders. Rifle company commanders can utilize vehicles of their weapons platoons. However, these are not the only individuals who will wish to have manuals in their own possession. Although the variety and number required by an individual varies in inverse ratio to his rank, there are always at least one or two which are likely to be needed by everyone, and needed badly.

One, and perhaps two, can be carried as additional equipment on the person without undue fatigue under all but the most arduous conditions of field service. For a platoon sergeant, FM 21-75 might well be desirable; for a platoon leader or a company commander, the same manual, as well as that for his particular company—FMs 7-10, 7-15, 7-25 (now obsolescent), 7-30, 7-35, and 7-37 for the rifle, heavy-weapons, battalion-headquarters, service, antitank, and cannon companies, respectively. A battalion commander could with

equal convenience carry on his person a copy of FM 7-20, a manual touching on most phases of regimental, as well as battalion operations. It might indeed be suggested, with all due reverence, that with the dying out of the custom of carrying a Testament in one's breast pocket, the battalion field manual, if so carried, may well prove to be the instrument of saving not only the life of the wearer, but indirectly through a familiarity with its contents, the lives of many of his subordinates as well.

The fact having been discussed that only a limited number of manuals is listed for distribution and that these may not be permanently retained by individuals, but must be circulated, there remains to indicate how they may be secured and retained by authorized personnel.[2] Section IV, War Department Circular 401, dated December 1942, identifies the Superintendent of Documents, Washington, D. C., as possessing the authority to control the sale of War Department publications. In this circular, particular attention is devoted to the sale of restricted material. What it boils down to is that the bookshops of general and special service schools may purchase and resell to military personnel such restricted and, presumably, unclassified publications as will supply reasonable demands.

[2]FM 21-6, List of Publications for Training, expressly provides for this by stating in paragraph 9*b* that individuals, headquarters, and offices may, on showing need therefor, obtain any printed pamphlet by applying to the distributing agency serving them. The agency in this case, designated in paragraph 9 of the same manual, is the AG depot of the local service command, which distributes the publications through channels. However, since such distribution may be delayed, and, in the case of a fairly small printing, be, in fact, impracticable, a further method is presented.

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